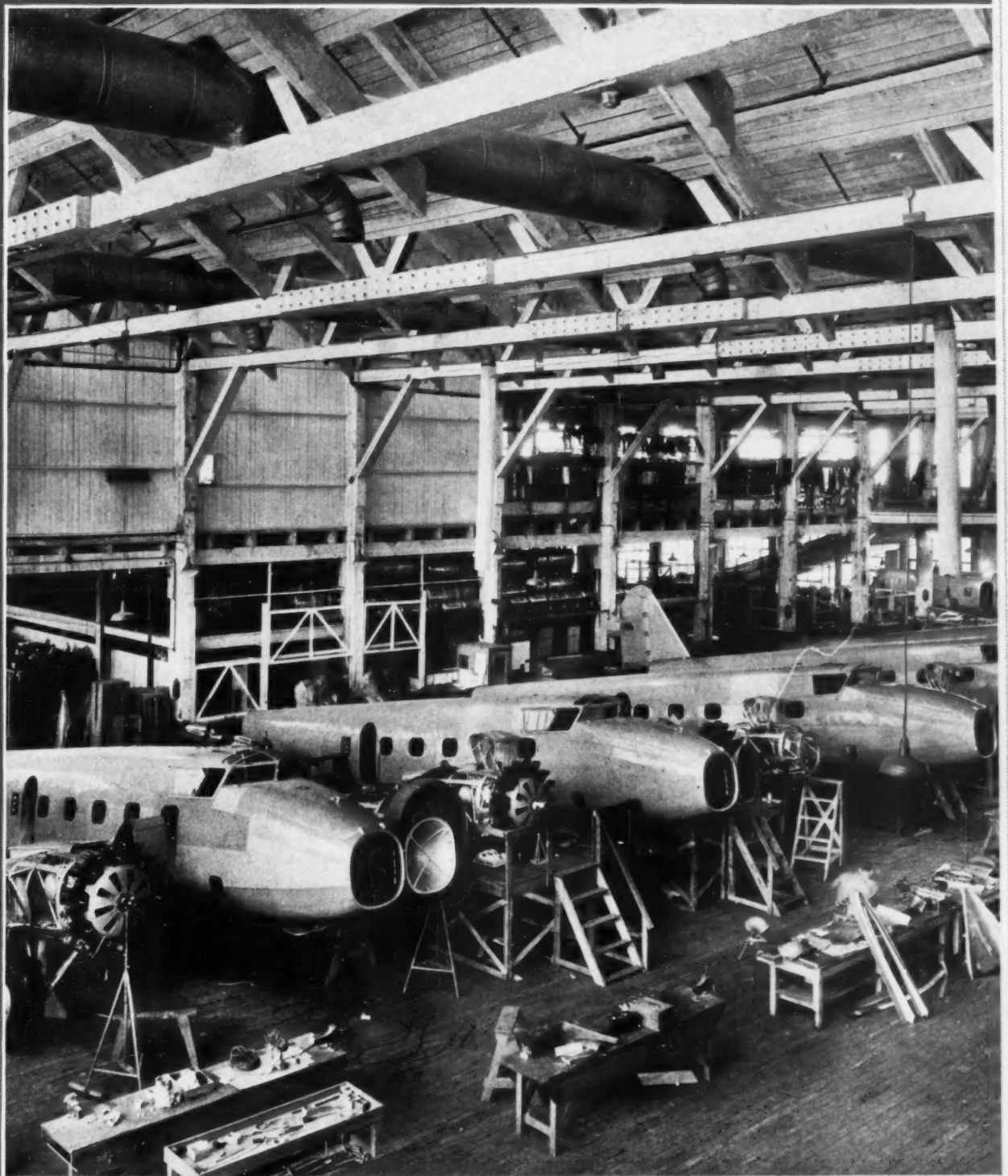


AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING



ABLISHED
8 8 O

CTOBER
1934

THE AIR CONDITIONING SECTION

Page 23

AMERICAN ARTISAN



BROWNIE DOESN'T WAIT FOR BUSINESS... *he goes after it*

How often have you wondered why one sheet metal shop in a town seems always prosperous while others just eke out a mere existence—or don't?

It's the old fight for business—tying up with dependable materials—doing good work—and letting everybody know that you want their orders. This is how one man does it.

C. E. Brown of Brownie's Sunshine Tin Shop has long been a Toncan Iron enthusiast. This year he made the City of St. Petersburg, Fla., sit up and take notice when he entered an all-Toncan Iron float in the Annual Festival of the State Parade. The intricate design and clever workmanship not only demonstrated the easy-fabricating qualities of the metal, but also suggested many varied uses.

There are times when every sheet metal worker wants a material that will last longer—wants something that he feels safe in recommending. That's when this alloy of refined iron, copper and molybdenum, with a rust-resistance surpassed among the ferrous metals only by the stainless steels, should be given every consideration.

Write for "The Path to Permanence."

REPUBLIC STEEL CORPORATION

GENERAL OFFICES



YOUNGSTOWN, OHIO

ALLOY AND CARBON STEELS	• TONCAN IRON	• STAINLESS STEEL	• PIPE AND TUBULAR PRODUCTS
HOT AND COLD ROLLED STRIP	• PLATES	• BLACK, BLUE ANNEALED AND GALVANIZED SHEETS	
BARS AND SHAPES	• SPECIAL FINISH SHEETS	• TIN PLATE	• NUTS, BOLTS, RIVETS, ETC.
	• WIRE PRODUCTS	• DIE ROLLED PRODUCTS	



25% Extra Discount

on your first

Hold-Heet Winter Air Conditioner

(This Special Introductory Offer Expires Dec. 31st, 1934)



Unit No. 3 of "Hold-Heet Plan"

Hold-Heet Air Conditioner

Complete as described below — Catalog ACA1
Dealer Price F. O. B. Chicago..... **\$67.40**

Less 25% special introductory discount
1 to each dealer, if
ordered before Dec. 31, **\$50.50**
1934.

The Hold-Heet Winter Air Conditioner (Unit No. 3) comes complete with Ballentine capacitor motor, direct connected fan, 100 speed control, 4 filters, fanswitch, all assembled in steel cabinet.

Silent Fan

Absolutely silent 22" pressure fan (patented) open design permits free gravity circulation.

"100-Speed" Control— 1,000 to 2,500 c.f.m.

Adjust capacity to exact household requirements, tune out duct vibrations. Ample capacity for 10 rooms.

2-Year Filters

4 oversize filters each 20" x 30". (Non-sagging, steel-frame "throw away" type). Double ordinary area give low resistance, free gravity circulation.

Fully Automatic Controls

Operates automatically—only when needed.

In Cabinet—Ready to Hook Up

Comes assembled in 28" x 30" x 58" welded steel cabinet, ready to hook into cold air return. Maximum capacity. Minimum floor space.

Universal Model

One standardized production model for all makes and types of furnaces. It is Unit No. 3 of the "Hold-Heet Unit Plan of Complete Winter Air Conditioning and Summer Cooling."

ONE TO A DEALER —No more. Between now and Dec. 31, 1934, No longer. An extra 25% discount to be passed on to the homeowner in consideration for his agreement to permit you to show his Air Conditioner to other prospects.

This special introductory discount is given to help you get started and *a start is all you need*. We have found that wherever one of these units is installed *it sells many more*. Like the waves that spread from a pebble dropped in a pond, waves of buying spread in ever widening circles around each new Hold-Heet installation. Install one, and you have sold a community. Sell the neighborhood, and you have sold the city. This is no ordinary opportunity. It is a dynamic thing that can carry you to unlimited sales and profits.

Guaranteed the Finest Unit Built

Do not judge the Hold-Heet Winter Air Conditioner by its cost. It is by far the finest Air Conditioner built regardless of price. Embodying fundamental engineering developments (patented) not adaptations from previous equipment, it has been built up to Hold-Heet quality, not down to competitive price. It remains as designed, the finest Conditioner that can be built -- without trimming or substituting to cheapen. Read the Hold-Heet "No Risk" Guarantee and order with confidence.

Now Is The Time

Now is the time to cash in. Air Conditioning is on everybody's lips. Public interest is white hot. Here is the setup that will carry thru — the first standardized production unit, that goes with any type of furnace; head and shoulders above other equipment in performance, price appeal, principle, capacity, construction, features and operating cost.

Order your introductory unit today. Send in the coupon. It can lead to fortune. You cannot lose.

RUSSELL ELECTRIC CO., Mfrs., 342 W. Huron St., CHICAGO

Hold-Heet

"No Risk" Guarantee

HOLD-HEET Controls and Air Conditioning Equipment are manufactured and offered for sale as the finest equipment built. They are GUARANTEED to be superior in construction and performance to any similar equipment on the market, regardless of price.

Any HOLD-HEET UNIT may be ordered and returned if, IN YOUR OPINION after test it does not prove to be superior to any similar product built, and the full purchase price and transportation costs will be immediately refunded.

RUSSELL ELECTRIC CO.

ORDER COUPON

Russell Electric Co., Mfrs.,
342 West Huron St., CHICAGO

Send one Cat. No. ACA1 (Unit No. 3) Hold-Heet Winter Air Conditioner, as described at dealer cost of \$67.40 less extra discount of 25% as per your introductory offer. It is understood that we are protected by your "No Risk" Guarantee.

Signed

Address

City..... State.....

Send thru.....
(Jobber)

() Check enclosed () Send C. O. D.
(Rated firms will be shipped on open account)

Covering All Activities
in
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Ventilating
Roofing



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1879

AMERICAN ARTISAN

With which is merged

**FURNACES
AND
SHEET METALS**

AND

**Warm-Air
Heating**

Vol. 103, No. 10

October, 1934

Founded 1880

CONTENTS

"We Lay an Egg"	11
The editorial.	
Let's Go with FHA	12
Everyone is talking about FHA. Most persons in the construction industry view the act as the first real attempt to bring our industry out of the depression. Here's some information.	
Facts You Should Know About FHA	14
Contractors will be called upon to explain to prospects just how FHA operates—what steps must be taken—what forms must be filled in. The contractor must know the answers presented here.	
Fabrication of All-Metal Aircraft	16
The all-metal aircraft industry has brought metal fabrication, die and pattern making to the high state of control related here.	
What Burns Out Grates?	18
You probably will be asked this question dozens of times this winter. Probably you will give the stock answers—ashes, too much draft, etc. This article throws all these stock answers in the ash can.	
Furnace Cleaning Brings New and Repair Work	19
This eastern contractor has developed some new ideas on the subject which you may be able to use in your work.	
A Hollywood Face Lifting Job	21
Some of the FHA literature shows before and after remodeling of a Hollywood shop building. We tell you about the job.	
American Artisan Survey of Code Authority Progress	22
Since September reports have been received showing that numerous states have set up preliminary or final code authority committees and areas of jurisdiction. Here is the report.	
The Air Conditioning Section	23
Air Conditioning a New England Home	28
Photographs and plans of an individual trunk line system using an oil burning furnace and interesting features of design.	
Night Air Cooling	30
As a result of our articles on night air cooling many contractors have requested a boiled-down summary of the necessary facts. S. Konzo, of the Research Residence staff, has written a two-part article explaining this whole idea.	
The Frigidaire Air Conditioned House at Century of Progress	32
Hundreds of thousands of persons have visited the Frigidaire house at the Century of Progress. Here are the facts about the installation.	
Automatic Controls in Air Conditioning	34
We conclude our discussion of a control system using a two-speed fan. The article reviews several current versions of this system.	
Let's Talk About Inlets and Outlets	38
This article on air conditioning radiator heated houses brings up the highly important question—where and how many inlets and outlets?	
Air Conditioning Problems	40
Beginning a new section to be devoted to answers to questions related to air conditioning.	
Air Conditioning Brings Relief to Operating Rooms	41
Most people dread operating rooms. We know now that recuperation is much faster in clean, cool, invigorating air.	
A Desert Submarine	42
This contrivance is called a submarine because it is always covered by water. It is used for sleeping comfort in desert regions.	
Association Activities	55
Latest information from associations on their activities.	
The Problem Corner	56
Questions and answers from near and far. We need your help on a couple of them.	
New Products	57
News Items	59
New Literature	66

More than 7,000 copies of this issue are being distributed.

WHY NOT
SELL
 THE
BEST-KNOWN
 BRAND
 ?

OTHER conditions being equal... the product marked with a well and favorably known name is easier to sell. That is an established fact, one which successful merchants recognize and use to their advantage in a dollars-and-cents way.

AND... that is why many successful sheet metal contractors use and sell Anaconda Copper. This best-known brand is accepted by the public generally as the standard of sheet metal quality.

When you push Anaconda Copper, you make *your* selling job easier. At the same time you provide your shop with metal that reflects the fine quality of your workmanship. Leading supply houses carry Anaconda Copper in sheets and rolls, also copper gutters, leaders, elbows and shoes identified with the Anaconda trade-mark.

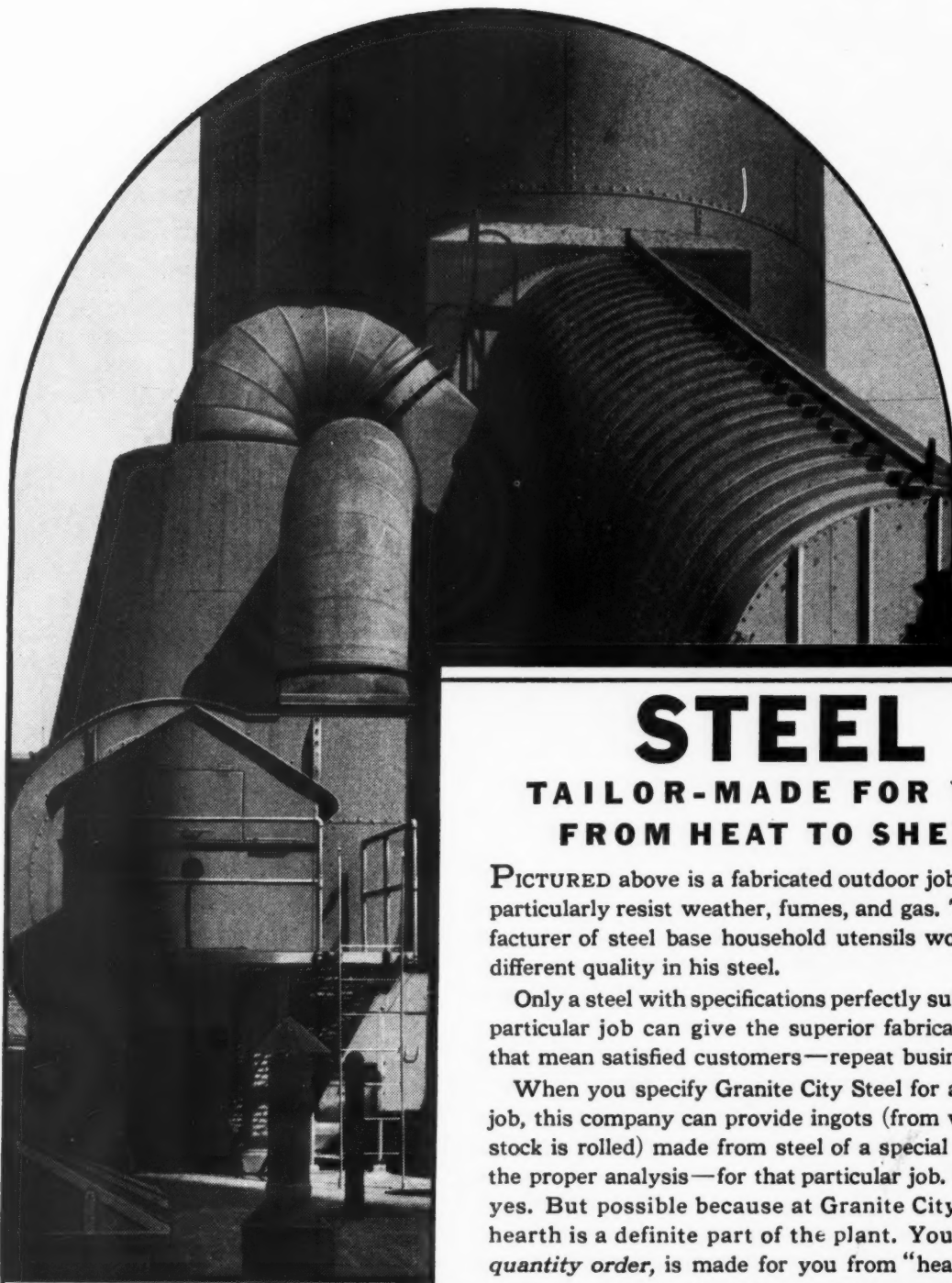


THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut

ANACONDA COPPER





STEEL

TAILOR-MADE FOR YOU FROM HEAT TO SHEET

PICTURED above is a fabricated outdoor job that must particularly resist weather, fumes, and gas. The manufacturer of steel base household utensils would need a different quality in his steel.

Only a steel with specifications perfectly suited to each particular job can give the superior fabricated results that mean satisfied customers—repeat business.

When you specify Granite City Steel for a particular job, this company can provide ingots (from which your stock is rolled) made from steel of a special analysis—the proper analysis—for that particular job. Unusual—yes. But possible because at Granite City, the open hearth is a definite part of the plant. Your steel, on *quantity order*, is made for you from “heat to sheet.”

And Granite City Steel is made at Granite City, Illinois, only 15 minutes from St. Louis, served by 29 railroads and the Mississippi River—better service to the Mississippi Valley, the West and the Southwest.

**GALVANIZED SHEETS
STEEL SHEETS
PLATES AND
TIN PLATE**



GRANITE CITY STEEL CO

GRANITE CITY, ILLINOIS
5719 Ellsworth Ave., Dallas
916 Walnut Street, Kansas City

1805 Boatmen's Bank Bldg., St. Louis
1613 Pioneer Building, St. Paul.
1502 Mariner Tower, Milwaukee
110 South Dearborn Street, Chicago

The most important MESSAGE ever sent to FURNACE DEALERS

THE FOX FURNACE COMPANY, ELYRIA, OHIO,
IS NOW FINANCING THE SALE OF SUNBEAM
FURNACES AND AIR CONDITIONING UNITS, IN
CONNECTION WITH FEDERAL HOUSING
ADMINISTRATION.

● Sunbeam Heating and Air
Conditioning Systems for Re-
placement Are Financed With
—No Down Payment—1 to 3
Years to Pay—Small Monthly

Payments—Lowest Financing Rates in History—
No Delay—No Red Tape—No Mortgage.

Sunbeam Heating Contractors Receive the Full
Amount of Their Contract Price Immediately;
None Is Held Back—They Endorse Notes WITH-
OUT RECOURSE—They Submit No Financial
Statement and Do Not Incur Any Financial Re-
sponsibility.

Millions of home owners need and want
new heating systems. You want to sell
them these heating systems. Only one
thing has kept you apart—MONEY. The
Sunbeam Financing Plan Now Pro-
vides the Money.

Sunbeam literature, newspaper
advertisements, display posters
with which to broadcast this
sales-producing financing plan
to every prospective buyer are

already in distribution and are producing actual
sales—not next week, or next month, or next year
—but NOW!

If You Are Endeavoring to Sell Any Prospects
Whom This Financing Plan Will Clinch, Wire,
Phone or Return the Coupon for the Necessary
Forms—Which Are Simple—and Explanatory
Literature.

THE FOX FURNACE CO. ELYRIA, O. DIVISION OF **A** **AMERICAN** **RADIATOR** **& S** **TANDARD** **CORP.**
OF SANITARY

SUNBEAM
WARM AIR FURNACES AND
AIR CONDITIONING UNITS

RETURN THE COUPON

The Fox Furnace Company
Elyria, Ohio

Please send us a complete explanation of the Sunbeam Financi-
ng Plan in connection with the Federal Housing Administration.
Also copies of the necessary forms.

Name

Address

City and State.....A-10

PROVED HELPERS

**To turn out Better Jobs —
in Less Time . . . with Less Labor —
use these Parker-Kalon Products**

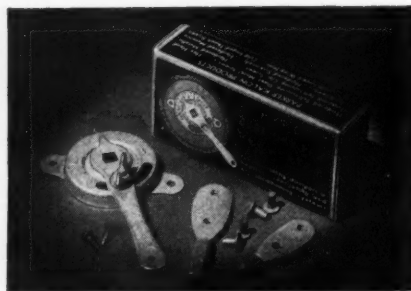
Among sheet metal workers everywhere these Parker-Kalon Products are famous for their help in turning out better work at a good profit. On nearly every job you can use one or all of them and save time, labor and money.

Hyro Damper Control Sets Save Time and Bother



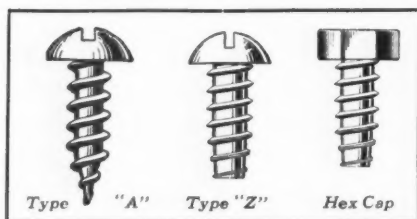
These two HYRO Damper Controls, long preferred by sheet metal workers, now come in handy "complete set" packages which save the time and bother of getting together all the different parts. Each box contains an UNXLD Damper Quadrant (the standard and best control device), or Dial Damper

Regulator (a most efficient yet inexpensive control) with necessary Damper Bearings, correct size Parker-Kalon Sheet Metal Screws for fastening the control to duct; and rivets for attaching Bearings to damper. Your supply house can furnish them in sizes to meet your needs.



For Easier, Quicker, Cheaper Fastenings . . . Try These

Insist on genuine Parker-Kalon Hardened Self-tapping Sheet Metal Screws . . . the easiest, quickest, cheapest means of assembling sheet metal. They always go in easily and hold securely. Heads don't twist off . . . threads don't strip.



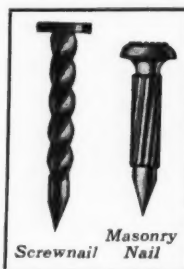
Type "A"—the original Sheet Metal Screw. For assembling sheet metal up to 18 gauge.

Type "Z"—for fastening to sheet metal from 28 gauge to 6 gauge and to aluminum and die castings, Bakelite, etc.

Hex Head Hardened Self-tapping Cap Screws—for fastening to sheet metal from 24 gauge to 10 gauge, and also to steel plates and structural shapes up to 1/2 in. thick, or solid brass, bronze, die castings, etc.

Hardened Screwnails—for fastening sheet metal to wood. Hold 4 times stronger than ordinary nails. Won't bend, back out or pull out like ordinary nails.

Hardened Masonry Nails—the easiest, cheapest means of making fastenings to brick, mortar, concrete. In most cases, can be hammered in without drilling.

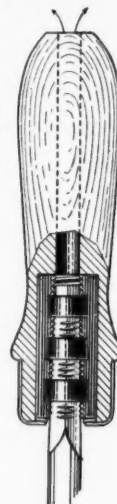


Hyro No. O.X. Punch Outfit quickly pays for itself

Here is the famous Hyro No. O. X. Metal Punch, with a full set of 7 punches and dies, in a sturdy steel case. A fine outfit which will save time and labor on every job. It will return its low cost of \$5.90 (F.O.B. N.Y.) many times over. Write for folder which gives full details about both this outfit and the Hyro No. X. X. Combination Bench and Hand Punch.

Shur-Grip Solder Iron Handles will STAY ON!

Screw on a Shur-Grip Handle and it will STAY ON. A unique die firmly locked in the handle cuts a thread on stem of iron and holds like a nut on a bolt. Ends the waste of time needed to burn an iron into an ordinary handle. Won't char or burn as stem of iron does not touch wood in handle, and vent hole through handle keeps it cool. Three sizes for all irons from 1 1/2 to 12 lbs. Try the Shur-Grip File Handle, too.



PARKER-KALON CORPORATION
190 Varick Street New York, N. Y.

PARKER-KALON PRODUCTS

Sold Only by Recognized Distributors

A Few Calls on Makers of Drugs

...and you land **JOBS LIKE THESE**



Miscellaneous Monel Metal utensils used at plant of a large Detroit drug manufacturer.

*In your locality, how many factories are there that make patent medicines, hair tonics, polishes and other drug store items? They all are interested in Monel Metal equipment...most of them use it. Tell them you can **MAKE** it!*

GET out your phone book and turn to the "classified" section. Write down all the companies listed under "Drug Manufacturers"—"Pharmaceutical Manufacturers"—"Toilet Goods Manufacturers", and so on.

Go around and see the superintendents of these plants. Tell them about your facilities. Encourage them to let you quote on Monel Metal equipment, such as the following:

Bins	Funnels	Table Tops
Containers	Hoppers	Tanks and
Chutes	Oven Linings	Tank Linings
Covers	Pails	Troughs
Dippers	Pans	Trucks
Drains	Percolators	Utensils
Ducts	Scale Pans	Ventilating
Drying Trays	Sinks	Hoods
Filter Tanks	Spray Chamber	Water Baths
	Linings	

Explain that Monel Metal is rust-

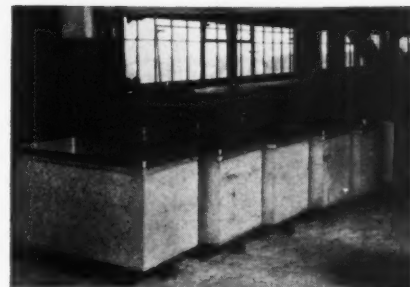
proof, that it resists corrosion, that it is easy to clean, that it is a solid metal with no coating to crack, chip or peel, and that it is as strong as steel. That's why it is used by drug manufacturers for all the foregoing equipment.

You know that Monel Metal is readily worked and can be fabricated into good-looking, durable items by the skilled workmen in your shop.

You will find it a help to land these profitable jobs if you read up on the uses to which Monel Metal equipment will be put by your customers. Write for FREE booklet, "How Monel Metal and Nickel are serving Producers of Drugs and Pharmaceutical" also, "The Application of Monel Metal and Nickel to Industrial Processing Equipment".

• • •

←View in California Perfume Co. plant at Suffern, N. Y. 12 of these Monel Metal containers, 6 of which are jacketed for cooling and all fitted with Monel Metal covers manufactured by the Falstrom Co., Passaic, N. J., from .078 Monel Metal sheet and No. 24 gauge covers. Containers are 32" diameter by 28" high and are used for holding shaving cream, bay rum, etc.



Group of 6 Monel Metal lined trucks in service at Bridgeport, Conn. plant of McKesson & Robbins, Inc., for transporting cold cream about the plant. These Monel Metal trucks are 24" x 26" x 48" and will hold approximately 1000 lbs. of cold cream. Made by Metal Products Corp., Weehawken, N. J., of 22 ga. Monel Metal sheet, double seamed and soldered with block tin.



At plant of a large Detroit drug manufacturer showing typical concrete sink lined with Monel Metal as used throughout plant.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York, N. Y.



Monel Metal is a registered trademark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel



Monel Metal



The National Housing Act is stirring up more business for you Our special finance plan enables you to handle it easily.

Series "C" and
"F" Cast Furnaces

Series "S", "D"
and "E" Steel
Furnaces

Series "B"
Gas Furnaces

Moncrief
"Aristocrat" Air
Conditioner

Moncrief Gas
Air Conditioner

Miles Junior Air
Conditioner

RIGHT around you are scores of homes that have needed new furnaces but couldn't find the money to buy them. The big campaign undertaken by the Government is encouraging home owners and stimulating them to buy, and the provisions of the National Housing Act now make it possible for them to get the money.

We have a simple finance plan that makes it easy for you to sign up this new business. No bothersome details. Just have your customer fill out the required Government application blank, sign our note, and get a credit report from a reliable agency. That's all. When the job is done, you get the full amount less the Government carrying charge, without recourse.

This is your big opportunity. Don't fail to grasp it.

Act now. Send today for details of our special finance plan, blank forms, etc., all ready to go.

THE HENRY FURNACE & FOUNDRY CO.

3471 E. 49th St.

Cleveland, Ohio

Manufacturers of

**MONCRIEF FURNACES
AND AIR CONDITIONING SYSTEMS**

We supply everything used on a Warm Air Heating Job





AMERICAN ARTISAN

We Lay An Egg

A man came into our office not long ago and said: "I'm preparing to market a new air conditioning furnace. This piece of equipment is one of the most remarkable products ever brought out. The American public has been waiting for this unit ever since air conditioning was first talked about.

"This conditioner is the last word. It has been refined so that it will be just as advanced in 1940 as it is today. My problem is marketing. I suppose the logical outlet is the warm air heating contractor, but I don't think he is a smart enough merchandiser. What I need is salesmanship."

This statement has been kicked around our business for many years. "The furnace man is a poor salesman; he's dead from the neck up," has been heard so many times that it's no longer funny.

The warm air heating dealer has been held up to the plumber, the electrical contractor, the specialty organization or what have you so many times that we all know the story by heart. The serious part of the whole funny business is that by far too many people who should know better slip into the habit of believing there is some truth in the claim.

The plumber. Is he a smart merchandiser? We venture the opinion that the average plumber who does heating is just as poor a salesman as the joke about his forgetting tools. The truth is that the plumber has been made a salesman, on the surface only, by the few manufacturers in his field who show him what to do and actually do it for him. Take those charming display windows with fancy colored bath tubs. We doubt if one plumber out of a hundred ever thought of showing a bathtub in his window. Someone told him to.

The electrician. In our experience the electrical contractor is a sorry figure. Did you ever hear of anyone who installed extra light outlets on the strength of an electrical contractor's sales campaign? Well, we never have either. Most electricians have even lost the sales of such things as radios, washing machines, electrical irons because

they are too engrossed in stripping insulation off BX.

The specialty organization. Here, according to the smart boys, is the real go-getter. Is he, really? Perhaps he can sell radios, or refrigerators, irons, and so forth, but these are all products which require only plugging into a light socket and are really sold by millions of dollars worth of high priced advertising.

As we see it, the producer of a product in the heating and air conditioning field has an entirely different problem. Be he the smartest merchandiser who ever trod the pavements, there is and can be no short cut to heating knowledge. It takes experience to learn this heating business and it will take even more experience to learn air conditioning. This school of hard knocks has no pony. The answers must be learned by trial and error, and the errors lurk in every stroke of the pencil.

Could we plug our air conditioning unit into a light socket and forget about it, all would be gravy. But we can't. Practically every job is a problem all by itself. Few jobs are exactly like any other.

We enter the usual picture with a house which if already built cannot be radically changed and which may be good, bad or indifferent, but we must adapt our job to it. We install our apparatus and lose all control over what the owner may do to our job; we may even get an owner who doesn't even know how to fire a furnace.

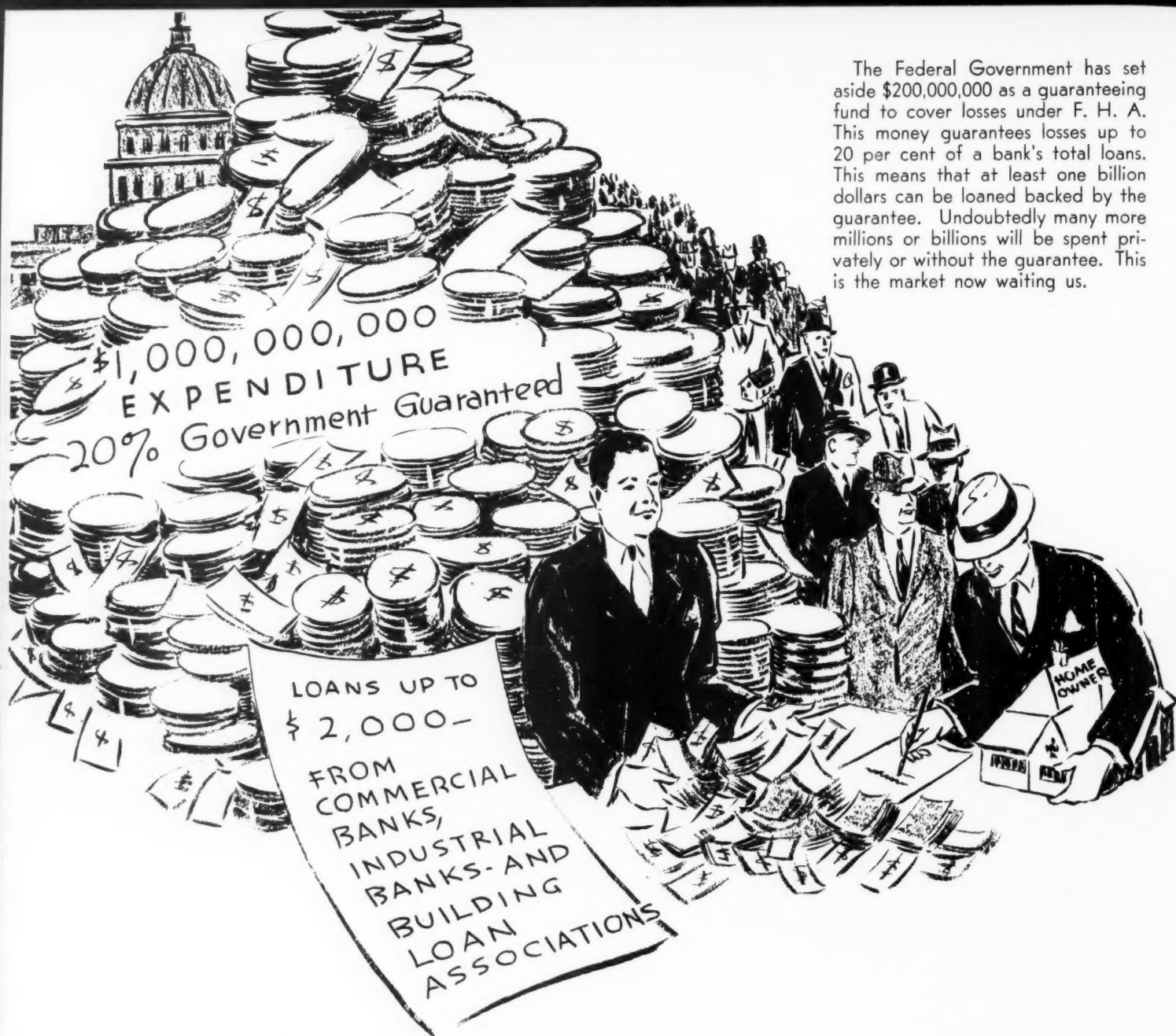
If a man buys a radio he may ask—"Can I get Europe?" If he gets some station which he can't understand one night in two months he spends the rest of the winter bragging about his set. Let this same man buy a heating system and what happens?

He tries to save fuel cost by firing lightly and goes blocks out of his way to tell us his job won't heat in any kind of weather. He hates to take out ashes so the fire goes haywire and we rush over to clean out the ashpit. His wife insists on opening windows on zero days to "air" the house and the whole family complains because the house was cold for two hours afterwards.

Yes, and when this same owner buys forced air or air conditioning he will cry to high heaven if the temperature varies more than one degree from cellar to attic no matter what is done with doors and windows; no matter how many pianos are pushed over registers; no matter how many times he "turns a handle just to see what happens" and finds out to our sorrow.

This experience comes to all of us year in and year out. As one old timer says—"I never miss a winter that I don't learn some new kink in human nature." The high pressure salesman may talk a few owners into buying his last word in apparatus, but the buyers seldom take more than one winter to tell the neighborhood what a rotten installation they have.

It takes the furnace dealer and his hard earned experience to sell our products and make these sales stick.



The Federal Government has set aside \$200,000,000 as a guaranteeing fund to cover losses under F. H. A. This money guarantees losses up to 20 per cent of a bank's total loans. This means that at least one billion dollars can be loaned backed by the guarantee. Undoubtedly many more millions or billions will be spent privately or without the guarantee. This is the market now waiting us.

Let's Go—With F. H. A.

THE country is talking about FHA.

Depending upon personal convictions, the Federal Housing Act has been called the best solution to the depression or the worst experiment yet tried, if we listen to current comment.

But so far as the construction industry as the nation's second largest industry or our own part of that industry is concerned, FHA represents the first real attempt to revive building, put millions of building mechanics back to work and at the same time provide home owners with a

soundly conceived method of paying for sorely needed repairs.

Detailed study of the Federal Housing Act should bring the conviction that this act is soundly conceived, is not based upon free gifts of money from the Federal treasury, and above all meets a real need at the real sore spot of this depression.

No one can deny that repair, remodeling, renovation of millions of structures are badly needed. Nor can anyone deny that millions of dollars of such repair work would have been done in the last four years could

owners have borrowed money at fair cost.

If we grant that FHA is soundly conceived what are the chances for its success?

This question holds, we believe, the utmost significance to our industry. What has been accomplished to date?

As far as we can determine this has been done:

Six thousand two hundred and thirty-one banks in every corner of the country have signified a willingness to co-operate. This means they have

agreed to loan money within the limitations of the act.

Latest reports from Washington state that 10,480 loans, representing \$4,600,000 have been placed on the books October first.

Slightly more than 1,500 institutions have reported loans to date.

What other facts are available for judging the progress of the program?

Of the loans made to date, the average amount of the loan has been \$443 and the average income

Of the loans made, here is the kind of work placed under contract:

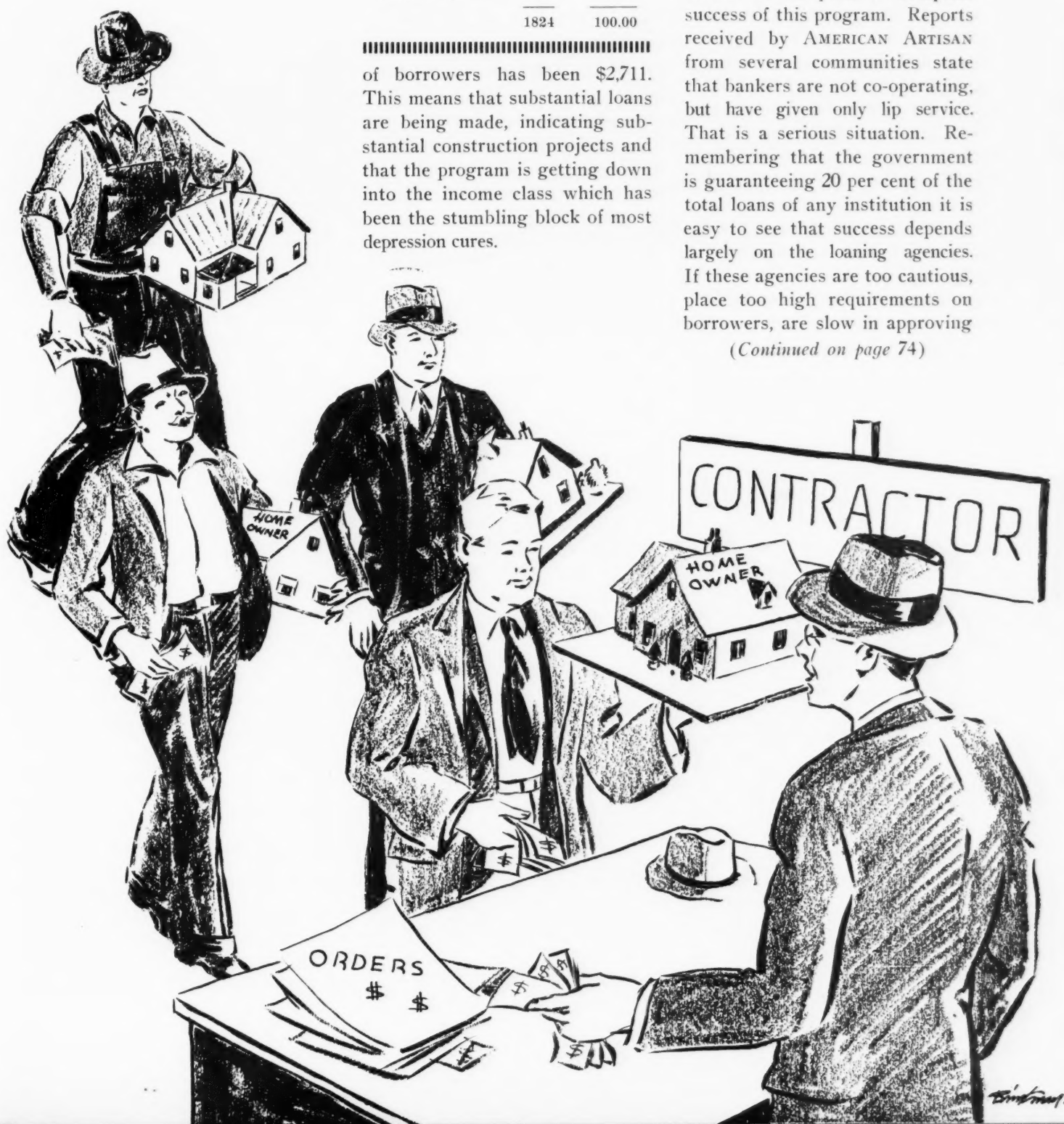
Purpose	No. of Jobs	Percentage
Heating	265	14.53
Inside Painting and Redecorating	264	14.47
Plumbing	252	13.82
Exterior Repairs...	177	9.70
Roofing	169	9.27
Outside Painting...	168	9.21
Remodeling—		
General	155	8.50
Interior Repairs...	102	5.59
Cementing	72	3.95
Lighting	64	3.51
Remodeling—		
Bathroom	56	3.07
Additional Rooms..	44	2.41
Remodeling—		
Kitchen	36	1.97
	1824	100.00

of borrowers has been \$2,711. This means that substantial loans are being made, indicating substantial construction projects and that the program is getting down into the income class which has been the stumbling block of most depression cures.

That there is a crying need for repair work is indicated in the Real Property Inventory published in the July AMERICAN ARTISAN which showed that there are at least 16,000,000 dwellings requiring repair work. Of this number probably 4,000,000 are so far gone that only rebuilding will help them, but the remaining 12,000,000 insure a field which will keep the construction industry busy for years to come even though there is no new construction.

There are, of course, stumbling blocks in the path to complete success of this program. Reports received by AMERICAN ARTISAN from several communities state that bankers are not co-operating, but have given only lip service. That is a serious situation. Remembering that the government is guaranteeing 20 per cent of the total loans of any institution it is easy to see that success depends largely on the loaning agencies. If these agencies are too cautious, place too high requirements on borrowers, are slow in approving

(Continued on page 74)



Property Owner's Credit Statement

To: _____ Date: _____

(Signature) _____ Account Number: _____

The following information is given for the purpose of obtaining credit under the provisions of the National Housing Act. The approximate amount of credit required by me (us) is estimated not to exceed _____ Dollars.

Name: _____ City of birth: _____ Date of birth: _____

Home Address: _____ Telephone Number: _____

City: _____ State: _____ Number of years at present address: _____

Salary, commission, or other regular compensation (per year): _____

State whether above salary etc. is received daily, weekly, semi-monthly, monthly, quarterly or annually: _____

Income from rents, amount (per year): _____

Other income, if any, source: _____

State amount per year being paid on account of principal and interest on property described herein: _____

Married or Single: _____ Full Name of Wife or Husband: _____ Number of Dependents: _____

Name of Employer:

Firm or trade style: _____

Address: _____

City: _____ State: _____

Kind of business: _____ Telephone: _____

Position occupied: _____

Name and title of superior: _____

Number of years with present employer: _____

If in business for self, please state:

Firm or trade style: _____

Address: _____

City: _____ State: _____

Length of time in present business: _____

Kind of business: _____ Telephone: _____

Trade references: _____

Business Checking Account: _____

Bank at which personal checking, savings, or thrift account is kept: (If none, state "None")

Name: _____ Address: _____

Are you making any installment payments to banks, loan companies, installment houses or others: (If none, please state "None")

Name of bank, company or institution: _____ Address: _____

Give details of proposed Alterations, Repairs or Improvements:

Describe work to be done: _____ Estimated cost: _____

Contractor or building supply dealer (if arranged): _____ Address: _____

Here Are the Facts You Need to Explain Federal Housing Act to Prospects

When applying for a loan, the property owner is asked to fill out a financial statement. This reproduction of one page of the statement shows the kind of information required by the loaning agency. The contractor should be familiar with the questions, because owners will want to know what information is required.

from Washington here are the pertinent facts you should understand and be able to explain:

The Modernization Credit Plan uses tried and tested principles to produce a unique method for financing repairs, alterations and improvements for property owners. Through the cooperation of financial institutions and the United States Government credit for property owners becomes available on the most reasonable basis ever offered for such financing.

Financial institutions may supply credit by the method with which they are most familiar. By making loans or purchasing notes under the plan, financial institutions will obtain an investment providing a satisfactory return plus compensation for the extra expense of handling this type of transaction.

The Government, providing insurance without cost to cover any probable loss to the financial institutions, will contribute its share to make this type of paper a distinctive investment.

Dealers and contractors will profit from the additional business resulting from the plan. They will obtain cash in settlement for the cost of improvement jobs arranged by property owners; and they are expected to give property owners the benefit of lowest cash prices.

Procedure to Be Followed

The handling of modernization credits under this plan is very simple. Consider the case of a property owner who decides he wants to make certain improvements, has obtained estimates, and has decided how the job will be done. He may engage a contractor. He may purchase materials from whom-ever offers the best prices. He may do his own work. There is no limitation on how he may do the job.

IN the July issue of *AMERICAN ARTISAN* preliminary information on the workings of the Federal Housing Administration, also information on the National Housing Act and the Home Owners' Loan Corporation was presented. Since July additional information has been released from Washington which clarifies the problems of procedure and places in the hands of the contractor exact information which may be passed along to the home owner who wants to put his home in good condition, but is hazy on just how to proceed.

It is important for contractors to be thoroughly familiar with the latest rulings and with the provisions of the various acts. Contractors should not assume that the home owner knows all about the new legislation; he should, rather, be able to explain to prospects who want work done, but don't know how to pay for it, how to apply for loans under the new laws and to act as counselor in the questions which are likely to arise.

The warm air heating, sheet

metal and roofing industries should be alert to take advantage of these new laws. The government is making it possible for the property owner to put his home in good condition by supplying ways and means for raising the necessary money. What the owner selects as the most essential repair work will depend, to some extent at least, upon the aggressiveness of the various lines of industry because in numerous instances the owner cannot get the money or will not be willing to obligate himself to buy ALL the improvements his home actually needs.

Many industries already have, or are setting up, industry agencies designed to help their outlets get their share of this work. If our industry is to get its share it is essential that contractors, manufacturers, and associations work together and start work NOW. Of all the things that most run-down homes need, no one thing is more necessary than a modern heating system, a good roof and drainage system.

According to the latest releases

To offer a plan practical throughout the nation, flexibility is essential.

Here, for instance, are typical plans:

Commercial Banks

Property owner goes directly to an approved bank, fills out and signs property owner's credit statement. If approved, he signs a promissory note. He then receives the proceeds and either engages contractors or purchases materials and does the work himself and pays the bills on the lowest cash basis.

Industrial Banks

Property owner presents his credit statement to the financial institution and if approved signs promissory note and receives the proceeds in cash. The principal difference between this transaction and the bank loan referred to above probably would be that a discount note would be used, and monthly payments or deposits might be accumulated to apply in a lump sum to pay the note at maturity.

Finance Companies

Property owner submits his credit statement to a contractor or dealer. The latter submits the statement to a financial institution for credit approval. If approved, contractor proceeds with the work. Upon completion of the job the property owner gives the contractor his promissory note for payment. The contractor after endorsing

The requirements for an FHA loan are lenient in the extreme. The cost is not exorbitant and the number of things a property owner can buy under the plan admits practically every type of contractor and almost every type of home apparatus. The man who gets to the owner first stands the best chance of selling his product or service. You can explain FHA if you understand the facts presented here.

the note, with or without recourse as arranged, sells it to the financial institution and obtains cash in payment of the job.

Limit on Cost

There is one basic requirement with which every method must comply. A financial institution may not collect in interest and/or discount and/or fee a total charge exceeding an amount equivalent to \$5 discount per year per \$100 original face amount of the note, the note to be paid in periodic equal installments not oftener than once a month.

For example, this means that for a job costing \$95, the note could have a face amount of \$100 and the total return to the financial institution could not exceed \$5, the property owner to make monthly installment payments of \$8.34 (with adjustment on last pay-

ment). The above assumes a 1 year note. So that the rate of return on notes from 13 to 36 months shall be no greater than on a 1 year note, a slight reduction would be required in the discount for the longer terms—exact detailed figures being supplied in "Tables of Calculations" available to approved financial institutions.

Consider some examples of how this would operate.

(a) A bank, for instance, might make a loan at 6 per cent simple interest—or some other interest rate—to cover the normal lending service, and if so empowered obtain a service fee to cover the extra cost of investigation and handling instalments and to compensate for the lack of a deposit balance on the part of the property owner. The only requirement is that the total amount so collected shall not exceed the equivalent of \$5 discount per year on each \$100, as stated.

(b) A finance company, or bank if so empowered, may deduct a discount of 5 per cent or a lesser amount, of the face of a note, which would include both the return for the use of the money as well as the handling or financing cost involved in this type of transaction. The only requirement is that the discount so collected shall not exceed \$5 per year on each \$100, as stated.

(c) A finance company, or bank, or other financial institution might arrange to handle the transaction this way: A note given by a property owner to a contractor or dealer providing for 6 per cent or some other rate of interest, will be purchased by the financial institution. The interest of course would be paid by the property owner. At the time of the purchase, discount fee could be deducted which might be absorbed by the contractor or dealer if so arranged. The only requirement, as in the other examples, is that the total amount, both in the form of interest on the note itself and the discount charge, shall not exceed an amount equivalent to \$5 discount per year on each \$100, as stated.

Loans or advances under this plan may be made only for property modernization purposes. For convenience in handling details of calculation, if the proceeds of a note are slightly in excess of the amount applied for, such excess may be considered as part of the modernization cost provided it is not more than \$5 on any one note.

Note Qualifications

1. Promissory notes must be signed by owners of improved real property and must be valid and enforceable in the state in which they are issued.

(Continued on page 72)

State below, details concerning the property upon which the improvements are to be made.

LOCATION OF PROPERTY: _____ (NAME OF APPLICANT) _____ (CITY, COUNTY AND STATE)

NAME IN WHICH TITLE APPEARS: _____

DESCRIPTION OF PROPERTY: Single family ☐ Multiple family ☐ Apartment House ☐ Store ☐
Office Building ☐ Farm Building ☐ Factory ☐ Warehouse ☐

VALUATION: Year in which purchased _____ Purchase price \$ _____
Amount of Fire Insurance \$ _____

MORTGAGES: Total of all mortgages \$ _____

Does placed _____ (See area.) _____ (See area.) _____ (See area.)
When due _____
Balances unpaid _____
Annual installments _____
Date of last instal. payment _____
Date of last interest payment _____
Name of mortgage holder _____
Address of mortgage holder _____

State whether or not installments and interest on the above mortgage or any other loans or encumbrances are past due: (If none, please state "None." If any, please give particulars.) _____

State whether or not all taxes, assessments, and fire insurance are up-to-date: (Latest receipted tax bill should be submitted with this application.) _____

Have you applied for, or received, a loan under the terms of the "National Housing Act"? (If so, give particulars.) _____
(NAME OF FINANCIAL INSTITUTION, OFFICIAL OR INSURING AGENCY DEALING IN THESE APPLICATIONS WAS ISSUED) _____ (ADDRESS)

Date of Application _____ Amount applied for \$ _____ Was application refused? _____

Other real estate: (If none, please state "None.") _____

MORTGAGE OR LIEN			PLACED ON OTHER TITLE APPEARS			PURCHASE PRICE	RENTAL INCOME
AMOUNT OF FIRST MORTGAGE	PAID BY	TAXES PAID	AMOUNT OF SECOND MORTGAGE	PAID BY	TAXES PAID	\$	\$

Have you any judgments, garnishments or legal proceedings against you? (If so, give particulars.) _____

Indicate exact manner in which you will make payments, if application is approved. Check (✓) plan desired: ☐ Monthly beginning one month from exact day on which loan is made. ☐ Monthly on the following date: _____ ☐ On the following indicated dates: _____

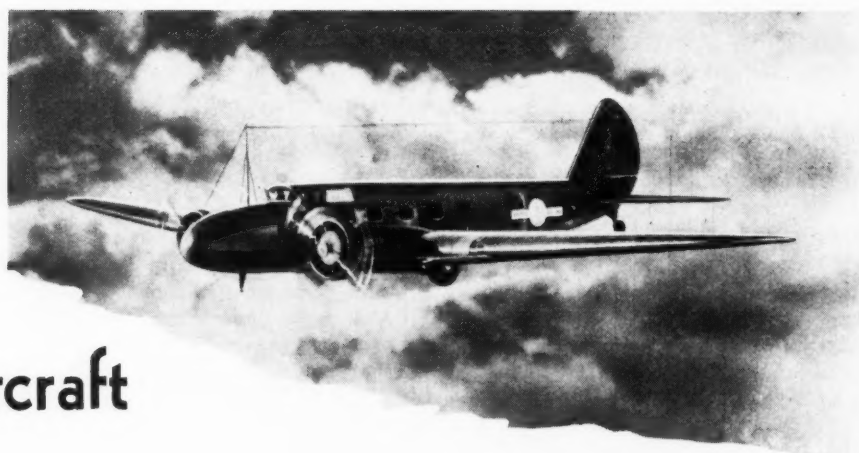
I (we) authorize you, or any financial institution to which you may desire to offer my (our) name for sale, to obtain such information as you (they) may require concerning the above customer and agree that it shall remain your (their) property whether or not my (our) name is finally accepted by you. I certify that if the loan is granted to me (us) or my (our) note purchased, the entire proceeds will be used completely in payment of mortgage, repairs or improvements upon the property described above and that no part of such proceeds will be used for the purchase of movable or detachable equipment excluded under the regulations of the Federal Housing Administration. I hereby affirm that each of the answers given to the foregoing questions is true and correct.

Signature: _____
Signature of wife or husband: _____

The second page of the financial statement, shown here, covers the property and its encumbrances. It should be noted that when completely filled in the loaning agency has specific information on the financial condition of the property. Contractors should see that forms are completely filled in and that no items are overlooked.

Fabricating Practice in the Manufacture of All-Metal Aircraft

By E. McGlone



Our front cover shows final assembly department at the Boeing Airplane Company with several of the low-wing, all-metal passenger-cargo transports nearing completion.

THE new three-mile-a-minute planes of the United Air Lines, which speed from Chicago to New York with ten passengers, crew of three and cargo, in 4 hours and 45 minutes, and flies from Chicago to the Pacific coast overnight, represents the triumph of aeronautical engineers and sheet metal workers in their long endeavor to obtain maximum strength with a minimum weight ratio.

The strength of the new plane is indicated in the results of tests which showed that the wing has a strength factor of 5.8, considerably in excess of the Department of Commerce requirements.

The wing can withstand a loading of $32\frac{1}{4}$ tons. The duralumin spars of the wing have a tensile strength of 63,000 pounds per square inch, as against the normal tensile strength of duralumin, of 26,000 pounds per square inch, the difference being achieved by heat treating in a vat of potassium nitrates heated to 960 degrees F.

In addition to duralumin, the following metals enter into the construction of the plane: stainless steel, for exhaust conduits; chrome-molybdenum steel, for engine mounts, landing gear and tail wheel; nickel steel, for terminals, bolts and certain accesso-

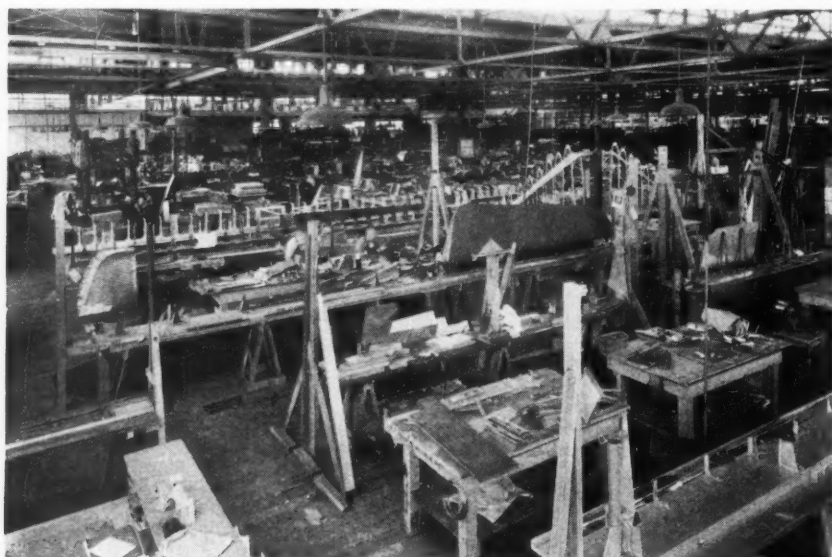
ries; pure soft aluminum, for gasoline tanks; and bronze, for bushings.

The operation under which these planes are manufactured represent highly developed and specialized application of practice in vogue in good sheet metal shops. An idea of the development of these practices is indicated by a discussion of such operations as welding, pattern making, making of jigs and dies, metal treating, and so forth.

Welding

With both the oxyacetylene torch and the electric arc being used, welding has an important place in the production of military and commercial planes. Parts handled by the welding shop include engine mounts, spar joints, landing gear treadles, exhaust stacks, tail wheel treadles, joint fittings and any number of smaller items. The electric arc generally is employed whenever there are any great variations in the thickness of material, while the oxy-acetylene torch comes into play where sections of material are of equal thickness and where parts are sufficiently small to be handled on the welding shop benches.

Thorough training is required for all welders, regardless of their previous experience, before they



View of the sheet metal department of the Boeing Airplane Company at Seattle, where sixty twin-engined low-wing monoplanes were built for United Air Lines' Coast-to-Coast and other air lines.

are permitted to handle production work. First-class welders, expert in their line, supervise this "school work" and oversee all production welding as well.

All the fundamentals of welding are taught, with a large amount of practice work included to familiarize the men with thinner gauge materials and various alloys used in aircraft construction. Emphasis is given such matters as uniformity of welds, heats required for various materials and thicknesses, arc length,

ethylene generators, oxygen cylinders, ox-weld blowpipes, and cutting blowpipes. Hydrogen and oxygen are employed for aluminum welding, such as that involving fuel tanks.

"Tooling Up"

Months before quantity production begins on a military or commercial project at the Boeing Airplane Company's plant, workers are busily engaged in turning out jigs, dies, templates, patterns, fixtures and all the other tools

half section of the plane in wood and covering the full height and shape of the body. On this half section, locations of rib sections, longitudinal stiffeners and bulkheads are worked out. Then, with one side of the plane's dimensions and locations true, the other side is developed. With both halves faired and checked, work is started on jigs, patterns and dies for the metal parts to be fabricated. Accurate to the "nth" degree, these tools make possible precision work, interchangeability of the plane's parts and substantial savings in labor and time.

Cradle jigs, forming one of the largest classifications produced by the wood shop, are of various shapes and sizes, in wood. In one of these, from fifty to one hundred metal parts are placed, drilled and riveted, to form a single unit as an outside body section for the plane.

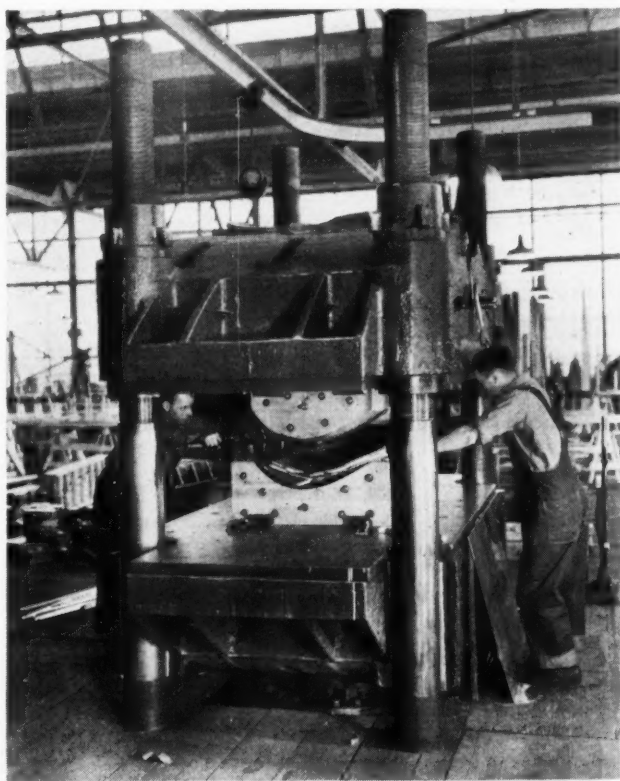
There are wood jigs lined with steel for use in cases where angles and channels must be offset, cut to length or bent to fit into position, and large assembly jigs, such as those for bulkheads, in which metal parts are arranged and held to dimension by locating blocks or framework. On these, rivet, bolt and joint locations are worked out and, in many cases, both drilling and riveting operations are carried out in the same jig.

Jigs and Patterns

Specially designed jigs are used for wing ribs and wood jigs are employed for smaller ribs and stiffeners. Grooves are provided in these, into which metal channels are fitted. Such jigs also are employed in cutting correct angles and lengths.

The wood shop also turns out patterns for castings of brass, steel, or iron in cases where wood dies are held unsatisfactory for forming members of heavy construction. Each casting is accom-

(Continued on page 61)



Shaping sheet metal cowlings in a hydraulic press in the sheet metal department, showing how dies made of hard maple are used in this 700-ton press to form the parts.

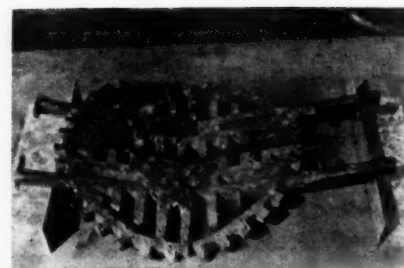
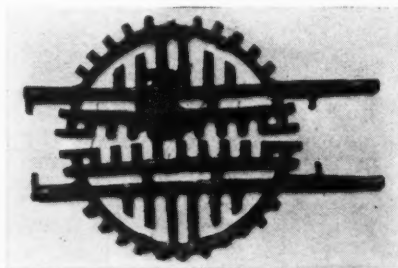
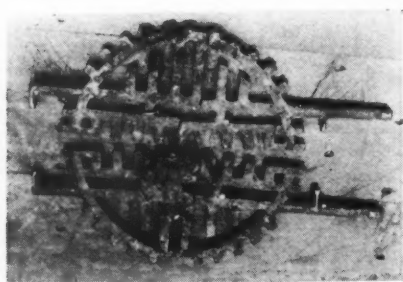
penetration, fusion of the two parts being welded, size of welding rod, current strength, width and character of bead, cause and prevention of burned spots, elimination of slag, proper rods for various alloys, most approved methods of handling complicated joints, shrinkage, etc.

While there has been no occasion to work on any part over an inch thick, the welding shop is equipped to handle metal ranging from .019 of an inch to three inches in thickness. Equipment includes five portable direct current welding sets, each with a capacity of 200 amperes; two ace-

required. Approximately 2,500 of these were built for the project involving seventy-five transports for United Air Lines and the general market.

Wood workers first make a "mockup"—a life-size model of the plane to be built—on which engineers can more readily visualize such matters as clearances, space requirements and visibility than would be possible from drawings. Entirely of wood, the mockup is complete to such details as doors, windows, chairs, instruments and controls.

Next, wood workers construct a master layout, representing a



Left—under side of grate showing slag accumulation and melting around open edge. Center—stove grate used with fine soft coal showing melted edge. Also shows spots where slag cut off draft leaving bars as originally. Right—the result from center picture is a grate broken across the center permitting center of grate to rest on ashes.

What Burns Out Grates?

By Frank E. Hess

“WHAT burns out grates?”

Most of us have our ideas. And probably most of the ideas are based on what someone told us years ago and which we have never taken the trouble to check.

This discussion is based upon some correspondence between the editors and Frank E. Hess of the Hess-Snyder Furnace Co., Massillon, Ohio. Mr. Hess began the discussion by asking the following question—“I am using a flat grate with draw center in one furnace and a triangle (single bar) grate in another. The draw center burns out and the triangular bars warp. Any information you can give will be appreciated.”

We countered with the usual suggestions about clean ash pits, a draft of air, prevention of slag, removal of clinker, too much poking and so forth. The result eventually was the interesting exhibit of photographs shown and some observations and suggestions offered by Mr. Hess from his forty-eight years in the heating business. Mr. Hess goes on to say:

“Up to 1891 I believed ashes up against the grate burned out stove and furnace grates. In February,

1891, a customer of ours claimed we used poor iron for the grates. He took me to the man who was burning out a set of grates about every thirty days. I asked him if it was true that he burned out a grate every month. This was his answer: “No I do not burn these out, I melt them out.” I asked if he kept the ashpit clean and to prove he did he took me into the basement and when he opened the ashpit door I saw a stream of hot slag running down through the grate about 1 inch in diameter.

“That was when I learned what burned out grates.

“This furnace was in a large dry-goods store, had a 32-inch firepot and with a 3-story building chimney. He had a very hot fire. He had been down about one-half hour before and had poked the fire to bring the hot coals on the grate. This was melting the ashes very fast. He had seen this before and had a bucket of water there and with a dipper threw water up against the grate.

“You will find most stove and furnace grates burned out either in the middle or at the back the only places that you can reach with a poker. You will always see slag at

these points. If you ask any number of people what are clinkers you will get just that many different answers. There is only one correct answer and that is fused ashes. A fuel that is high in ash gives more clinkers. You burn a ton of coal on the ground and you will not have any clinkers. Slow fires do not give any clinkers. When ever you get your fire hot enough to fuse the ash you get slag. Whenever there is an inch or so of ashes on the grate, the ashes act as a dam and this stops the slag as it comes down. Clinker is built up from drops of hot slag.

“I have written a great many professors and engineers and they all say ashes against the grates burn them out. How do they know? You cannot see anything when the ashpit is full. One professor added that if the ashpit was empty and then the grates burn out it was the fault of the smoke pipe or chimney and should be cleaned out to give more drafts to the fire. How can you burn a grate out with no draft in the chimney? Another says keep water in the ashpit. This will keep the grate bars cool and stop clinking. Other engineers say shake the grate to let more air through the

(Continued on page 69)



Left and right are two views of a bar in which slag melted down the casting, breaking bar at center. Note that most damage is back of the center point indicating that areas poked accelerate ash fusing causing slag which burns out the grate.



Furnace Cleaning Sells Repair and New Jobs

The Puff-Schreiber Co., Springfield Gardens, L. I., find contact with old customers and canvassing for new friends brings results. The point of contact is furnace cleaning and air conditioning.

WHILE the profit from the electric vacuum cleaning of heating plants is substantial to the Puff-Schreiber Co., Springfield Gardens, N. Y., they place special emphasis on this work every spring for the furnace renovation and new plant orders reached in this manner. Last spring, for example, these prominent warm air dealers and sheet metal contractors canvassed a section of Richmond Hill, a nearby suburb, with the object of bringing their cleaner into play earlier than usual in the year.

While inspecting existing heaters Mr. Schreiber found several that harked back to Spanish War days or before. Their owners proved to be well able to stand the expense of modern equipment, so the contractor advanced the suggestion that an air conditioning system would reduce coal bills and provide enough greater year-round comfort to warrant purchasing. (This is the way

one has to sell things nowadays, says Schreiber.) He brought out the additional feature of summer cooling, made estimates and took orders for five separate installations.

That getting into the basement to clean leads to profitable repair and remodeling is borne out in the fact that Puff-Schreiber Co. last year vacuum cleaned 324 heating plants and sold 17 new warm air plants as a direct result. Renovations, new smoke pipe, and repair work brought to these dealers some \$287.00 worth of jobbing work. So sure is the company that cleaning is the "entering wedge" that they agree to vacuum clean once free of charge every new furnace sold by them. Subsequent cleanings are charged for at regular prices that range from \$3.50 to \$10.00.

The general sales plan followed by these Springfield Gardens dealers is that known as "around the block." To explain, outside canvass-

ers are assigned specific non-conflicting street squares and they call at every building on the four sides of the block before passing to another block. Results of visits, information as to make, kind and condition of heating systems and like data are turned in daily on slips provided for the purpose. Thus Puff-Schreiber have on file information on practically all heating equipment in their town.

Should a homeowner telephone for a new grate, a new register, steam gauge or what not, the chances are that the contractors know the correct size and kind from examining their filing cards while customers are telephoning. The canvassers are paid a commission of \$1.00 per order and it is considered money well earned. The cleaning department is self sustaining, but the maximum profit comes from orders for jobbing and replacements.

In addition to newspaper adver-



Below is shown one of the sets of signs which the company rotates on its trucks throughout the year. Seasonal work is advertised on the various signs.

"Getting in is the big thing in warm air furnace and air conditioning selling," asserts Mr. Schreiber, and adds, "Our old customers are our best vacuum cleaning and replacement prospects. We let our around-the-block canvassers approach new prospects. Mr. Puff and I call on the old customers. Vacuum cleaning is the greatest vehicle for closer customer relations we know of. Our cleaning program has earned its cost many times over."

To demonstrate the importance the dealers attach to air conditioning it may be said that the leading piece of apparatus seen on the company's display floor is a large warm air conditioner. Although this is not fired, the front door is kept constantly open, the aperture being blanked off with a piece of celluloid cherry red on the inside and chocolate on the outside. In the fireport is a 60-watt electric light backed by bright tin and around which revolves at night a slotted shield. The arrangement produces

"Air conditioning is the big thing for the future," declared Charlie





A Hollywood Face Lifting Project

REMODELING in movie-land is an apt title for this new opus from cinema-land in which the sheet metal contractor played the leading role. On the corner of Highland Avenue and Sunset Boulevard, Hollywood, stands this neighborhood structure, now a pleasant, inviting store building, formerly the unattractive eyesore seen in the accompanying photograph before face-lifting and copper treatment.

Remodeled, according to plans by H. Roy Kelley, Architect, the original structure was dismantled, the unsightly sign removed from the roof and a sheet copper roof in antiqued green added. Copper was also used for the gutters and downspouts; also for the cornice, for strips around the

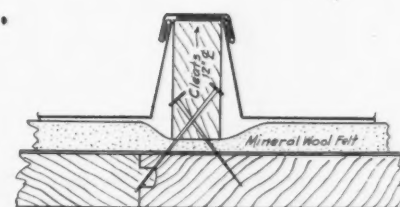
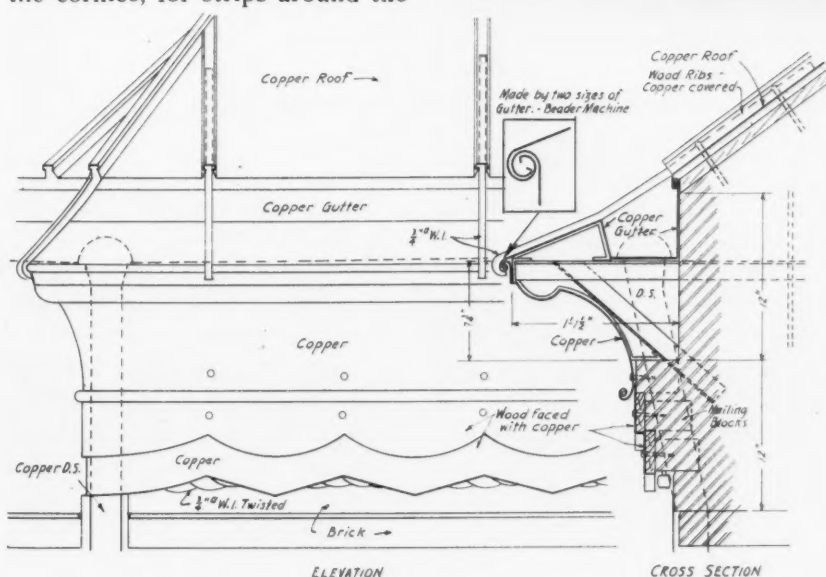
sign spaces and window strips and for a moulding to give outline to a wing containing additional store space.

All of the sheet metal, except the gutters, which are not visible from the street, was antiqued

green to harmonize with the roof and to make a contrast against the light green stucco of the exterior. A deeper green is used for the lettering. Sheet metal work was done by Emil Brown & Co., Los Angeles.



Above, the store building before alterations and at the top of the page, the result of the remodeling work.



Above—Cross section of a roof batten showing shape of wood batten, method of nailing batten and application of cap, pan sheets and cleat.

Left—Elevation through and of the face of the wall showing construction of gutter, roof, and cornice.



Election of Code Authority Committees and Organization of Code Areas Shows Rapid Expansion

Month by month American Artisan is trying to keep you informed on new elections of code authority committees and organization of code authority areas of jurisdiction. The map above shows that rapid progress has been made since the last map was published in September. Full lists of committee members and their addresses for the new areas shown in this map will appear in November when a final check has been made. Should you want information meanwhile write us.

IN the August and September issues of AMERICAN ARTISAN we reported the progress in code authority committee appointment and organization as found in a survey of the country.

Since the September issue we have received from National Code Authority committee information that the states of Oregon, California, Colorado, New Mexico,

Texas, Arkansas, Louisiana, Kansas, Wisconsin, Minnesota, Florida, Georgia, Alabama, Maine, Massachusetts, Rhode Island, Vermont, New Hampshire and Maryland have practically completed their organizations.

Lists of names of members and their addresses of the code authority committees for these states are not completely returned, but full information will

be available for our November issue.

Further reports state that the cities of Nashville and Memphis, Tennessee, have been organized and will embrace within their authority area all of western Tennessee. Chattanooga and Knoxville are in process of organization and will exercise jurisdiction over the eastern half of Tennessee.



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AMERICAN ARTISAN

Air Conditioning Section

**Devoted to the technical and merchandising problems
of air conditioning in homes and small buildings**

THE ramifications of air conditioning are so numerous and the art is so new that few men will hazard a guess as to its future. We can accept as a fact the statement that air conditioning is destined to be a major activity of American life but we must also realize that future development will be more interesting, more profitable than progress to date.

- - - Two major divisions seem apparent — winter air conditioning and summer air conditioning. In winter time heating, cleaning, circulation and humidification are the important factors. These four services are best obtained by a forced warm air system.

- - - To maintain our leadership we must know how to design a system and also explain and sell it to our prospects. Generally speaking, present knowledge is adequate, but refinements and betterments will be forthcoming.

- - - Open minds and a willingness to learn are needed.

HIGH MOUNTING
THERMOSTATS
are out of the
PICTURE



Illustrated above is the Modern TEMTROL

Comfort begins in the FOUR FOOT ZONE

A heat regulator can control the temperature only at or near its location. Conventional thermostats, either plain or clock type, are designed for mounting high on the wall. They can't possibly control the temperature down low in the room.

That's the reason the new Penn Temtrol is engineered especially for low mounting. Its principle of ANTICIPATION is the only type of operation that can deliver straight line temperature control

. . . uniform temperature within one-quarter of a degree . . . in the FOUR FOOT ZONE. . . where people sit and rest and play . . where comfort begins.

If you haven't already secured complete details of the new Penn Temtrol System, and the nationwide Temtrol advertising and sales campaign, write or wire today. It is an opportunity you don't want to miss. PENN ELECTRIC SWITCH CO., Des Moines, Iowa.



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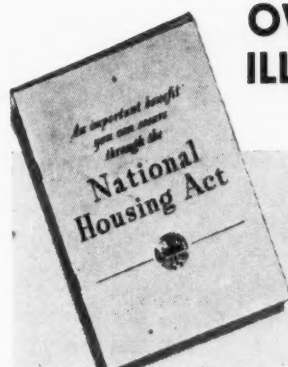
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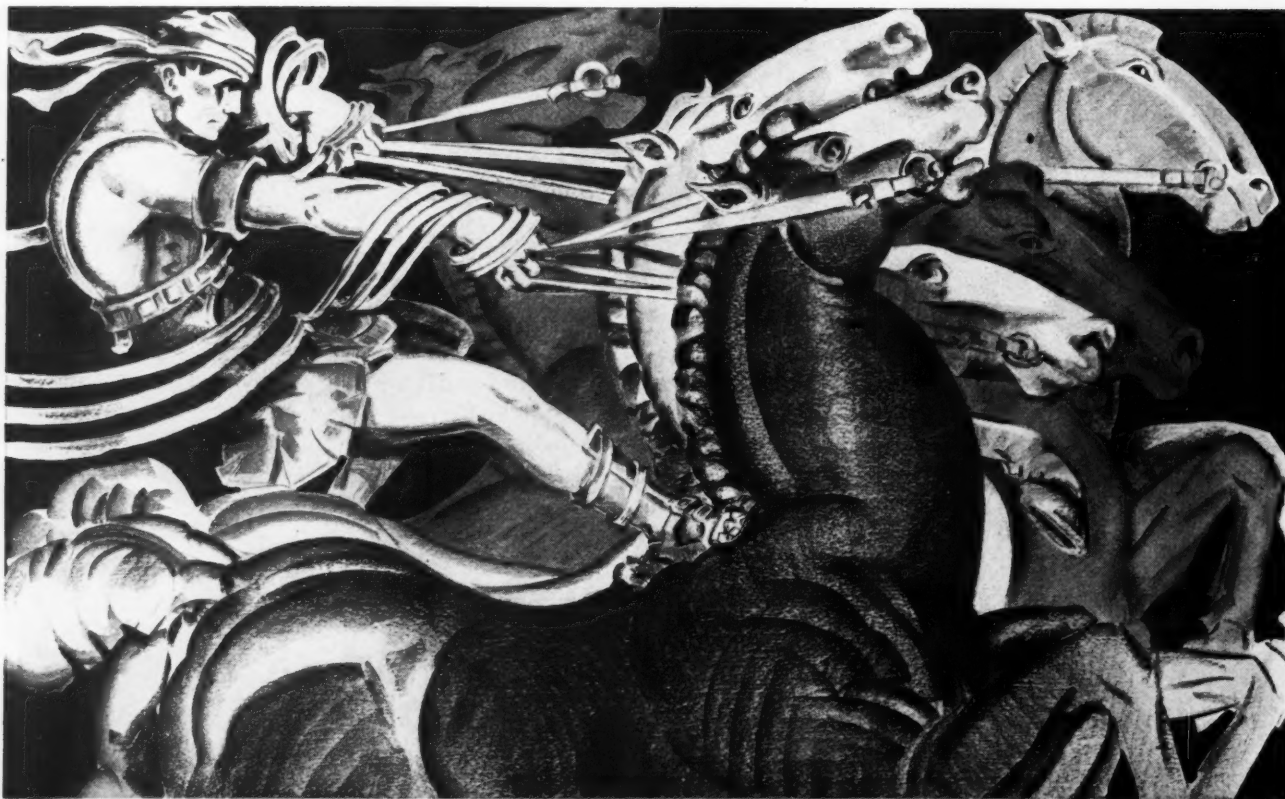
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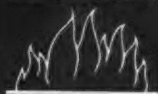
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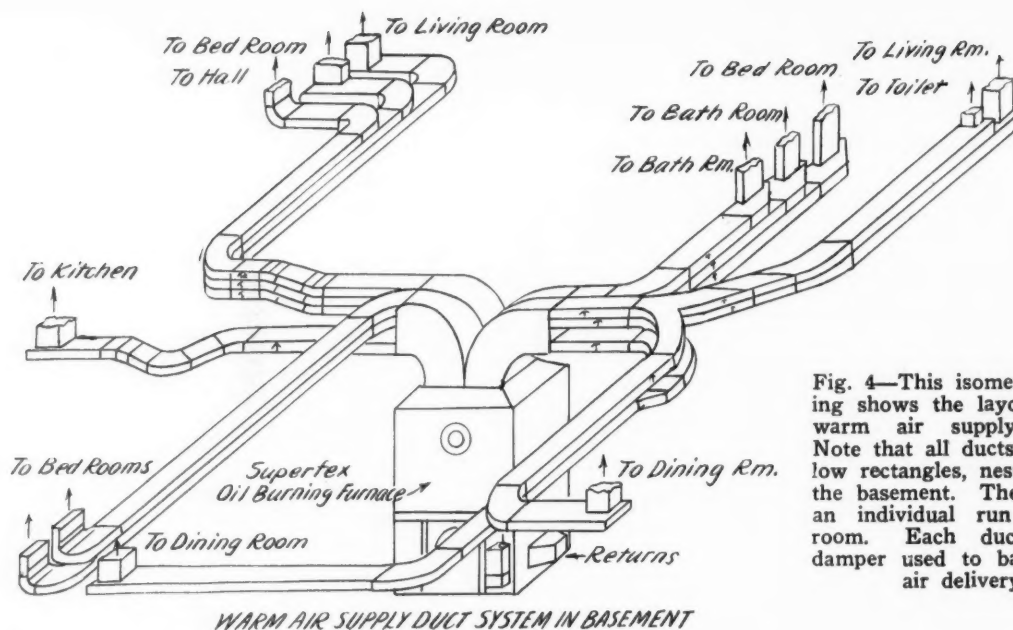


Fig. 4—This isometric drawing shows the layout of the warm air supply system. Note that all ducts are shallow rectangles, nested across the basement. The result is an individual run to each room. Each duct has a damper used to balance the air delivery.

Air Conditioning a Small Home in New England

By W. J. Buckley

THE New England section of the country has witnessed a healthy growth of home air conditioning business during the last few years in spite of the fact that New England has long been considered a steam, vapor and hot water heating section.

There is, however, general agreement on every hand in this territory that warm air is the best form of heat for the home, but—and then one hears of the terrible furnace jobs that are in operation, dirty, smelly installations, with a poor balance of heat distribution giving too much heat to some rooms and an inadequate amount to others. These unsatisfactory installations have been the direct cause of the distaste for these "hot air jobs," which have been a distinct discredit to the heating trade.

The general feeling in New England today is that air conditioning will, in the future, better exemplify in its new form the real virtues of warm air heating than did the old hot air furnace installations.

A Typical Installation

An air conditioning system of heating typical of present New England design was selected for installation in an early seventeenth century type of new single house designed by Smith & Walker, Architects, Boston, Mass., and erected at Belmont Hill in Belmont, near Boston, for Miss Amy Pierce.

Although the type of house is of the early seventeenth century style the most approved forms of modern construction have been incorporated therein. It is a two-and-a-half story affair of lean-to design, including the steep roof and the central high chimney, the narrow, vertically proportioned windows, overhanging second story.

The entrance hall and the staircase are of the

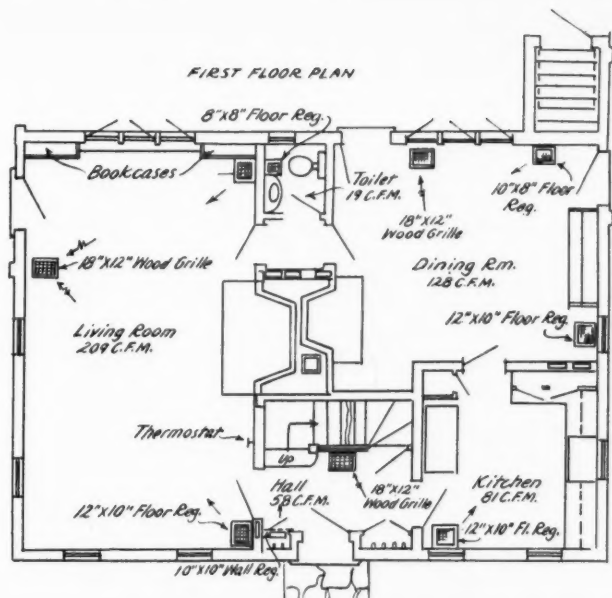
very early American design with ribbon-moulded wood sheathing. The large living room is similarly sheathed in wood and has solid, hand shaped beams with chamfers and lamb's-tongue moulding. An unusually large fireplace constructed of old brick completes a true picture of an early room.

The dining room is sheathed throughout with ribbon-moulded boards of knotty pine. The floors of the whole house are of random width boards. The bedrooms are carefully proportioned to agree with the beautiful rectangular, low-ceiling rooms of early days. A feature of the second floor is the completeness of the owner's suite with its dressing room, bath and wardrobe.

Equipment Selection

An oil-burning steel furnace of the unit attached air conditioning type, with forced, filtered and humidified air supplied by an air-conditioning unit were installed by the air-conditioning division of the H. E. Whitten Co., heating engineers and contractors, 9 Federal Ct., Boston.

The heat losses in the house figured 77,500 B.t.u.s. No part of the house is insulated and no heat losses were figured for the garage or the recreation room in the basement. The furnace selected has a rated heating capacity of 78,000 B.t.u.s at the registers while operating under forced air. The oil burner, built as an integral part of the unit, is of the gravity flow type with gravity air supply to the burner bowl. The burner burns only a number one grade of fuel oil, that is, volatile oil is necessary for ignition and combustion purposes. When burning a maximum of eight tenths of a gallon per hour of oil having 137,000 B.t.u.s rated content per gallon, it consumes a 109,600 B.t.u.



input. The outer casing of the furnace is finished in a very attractive maroon color enamel with black japanned trimmings.

Due to design of the system and the planned operating cycles particular attention was paid to using a blower offering little directional resistance to gravity circulation of air through the system when the fan is not operating. A constant speed motor with adjustable size motor pulley on the drive affords possibility for varying the R.P.M. of the fan and hence the C.F.M. of air to the furnace. "Dust-Top" filters were installed in a filter box in the return air line.

An automatic drip humidifier capable of evaporating 24 gallons of water in 24 hours was installed

in the furnace bonnet. When the temperature in the bonnet rises, a valve is opened by a thermostatic element located in the bonnet, and water runs into the evaporating pan located directly above the heating unit in the bonnet. The amount of water delivered is determined by the intensity of the heat in the bonnet and the adjustment of the valve.

The plans (Fig. 1, 2 and 3) indicate the layout of the basement duct system from the furnace to various risers and first floor registers, and on the first and second floor plans may be seen the locations of the room heat supply registers and the return air grilles as well as the risers and offsets to the second floor.

The furnace bonnet opening at the top is $22\frac{1}{2}$ by $22\frac{1}{2}$ inches, therefore, it was thought best in the interest of economy of cost of installation to make all the ducts of one size, namely, $11\frac{1}{4}$ by $3\frac{1}{2}$ -inch rectangular. In this way it was necessary to make but few fittings other than flat and sharp elbows of one size.

The Duct System

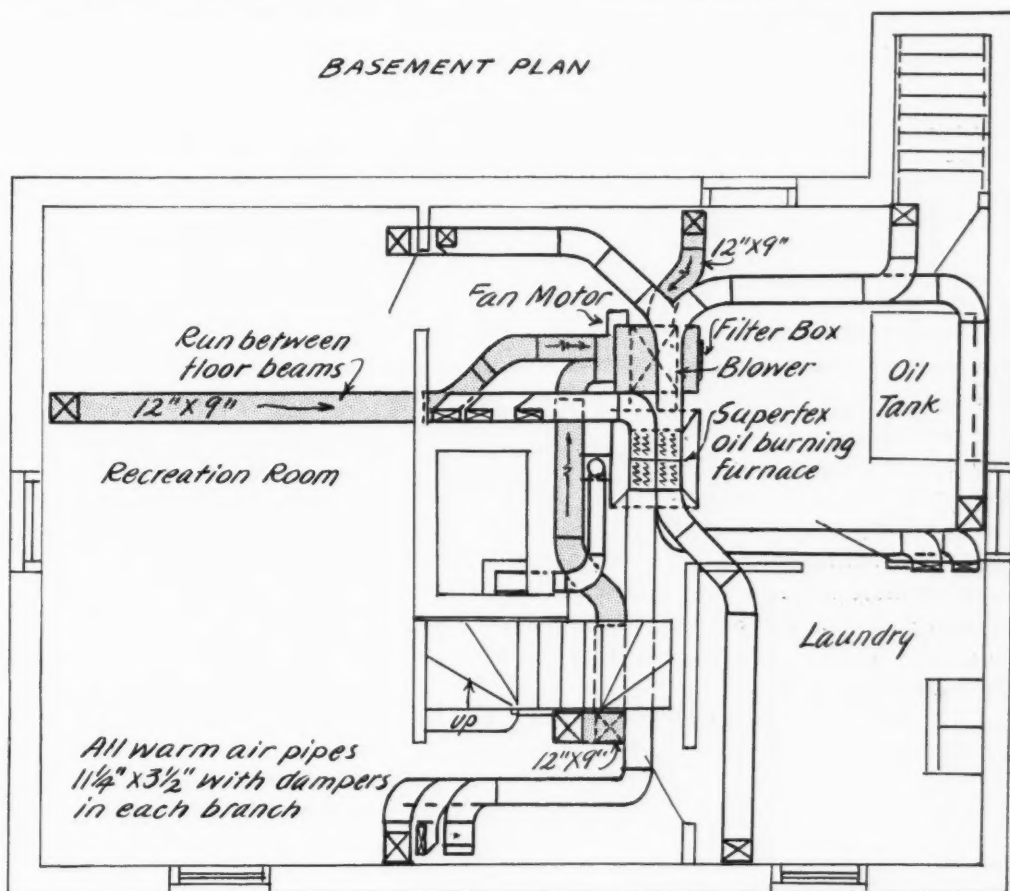
As shown on Fig. 4, four transforming elbows were installed on the bonnet to which all the $11\frac{1}{4}$ by $3\frac{1}{2}$ -inch rectangular pipes were connected and from which they were run to the various registers on the first floor and to the second floor risers. All pipe was made of twenty-eight gage galvanized steel, three-foot joints, double-seamed at one corner and made with connecting S slips on one end. The flat and sharp elbows were made with Pittsburgh lock and of the same gage of steel.

The duct system presented some difficulties of installation in that there was a great deal of inter-

(Continued on page 50)

Fig. 2—At the top of the page shows the first floor plan with the floor registers made necessary by the construction—wood joists hung on steel beams with the tops of both flush to the rough floor. Note the location of faces for air distribution.

Fig. 1—The basement piping plan shows the arrangement of supply and return and the turns made necessary by structural features of the house. Nesting the pipes made possible considerable saving in the number of runs showing in the basement.



NIGHT AIR COOLING

[PART I]

By S. Konzo

Cooling for comfort by means of ventilation has received widespread attention this past summer. A number of elaborate tests have been conducted from which a mass of data has been secured. Some of this data needs interpretation in the light of practical usage. The purpose of this paper is to present practical suggestions for the average installer in an average residence installation

THE past summer with its ghastly heat toll of death and suffering has emphasized more than ever the necessity of "doing something" to alleviate the discomforts of the hot weather. To a small class of wealthy people there are available various cooling machines that will cool the environment, reduce the humidity, create air motion, and produce an atmosphere of comfort. On account of the expense involved in such installations, however, most of these machines are at present beyond the purchasing power of the vast numbers of the people in the country. There does exist, however, a means of cooling that will help out quite materially in making living conditions more bearable in the summer for this larger group of homeowners. This method of cooling is not summer air conditioning in the true sense of the word. It is only a step in that direction, but it is a step that goes a great ways in "doing something" about the weather.

Cooling for the Masses

Night air cooling of residences is one form of cooling that can be made available to a great number of home-owners, who cannot afford a complete air cooling system. Furthermore, it is a form of cooling that should be considered as a supplement to any completely equipped air cooling system if the operating costs of the cooling system are to be kept at a minimum. Night air cooling is indeed nothing more nor less than a utilization of natural resources, and is probably the easiest method now available to alleviate the discomforts produced during summer heat waves.

Since the duct arrangement for this method of cooling can be incorporated readily into the duct layout of a forced-air system, it is worthy of consideration by all installers and manufacturers interested in forced air installations. The time to consider an installation of this sort is during the blue-

print stage of the forced-air job. It is the purpose of this article to present a brief summary of the factors involved in night air cooling and to offer some suggestions that may prove of interest to the installer and home-owner. Part of the discussion herein presented is based on the research work in summer cooling that was done at the Research Residence of the National Warm Air Heating and Air Conditioning Association in cooperation with the Engineering Experiment Station of the University of Illinois. In this article, however, the subject has been approached from the viewpoint of the installer and the manufacturer of equipment, and the primary purpose of the article is to answer the question of "How?"

What Is Night Air Cooling?

The outdoor air temperatures during the summer days are never constant, but are always changing from hour to hour. This change is more or less rhythmical and when the air temperatures are plotted, on a sheet of paper, against time it is seen that the general shape of the curve is wavelike; it is like a sine curve.

In practically all homes under summer conditions the outdoor air temperature will drop lower than the indoor air temperature some time during the evening hours, and will stay below the indoor air temperature all during the night. During this interval the house will be slowly cooling off, but on account of the heat storage capacity of the large mass of the house structure, this cooling process will not be very rapid. The rapidity of the cooling of the house structure will be dependent upon the amount of outdoor air that is circulated through the house. The primary purpose of night air cooling then, is to introduce air in such quantities into the house during the night hours, that the house structure will be cooled down as much as possible during

the night—so that the house can be closed up in the morning and the coolness in the house can be conserved for the heat of the following day.

How Daily Air Temperatures Vary in Summer

An intelligent understanding of the whole problem of night air cooling can best be obtained by a close study of a typical temperature chart, such as that shown in Fig. 1. This figure shows two temperature curves, one for the outdoor air and the other for the indoor air. The magnitudes of the temperatures for outdoor and indoor air will be

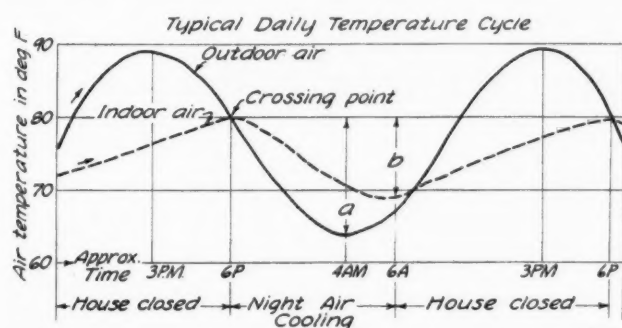


Fig. 1—This chart shows a typical summer day temperature cycle showing relationship between outdoor and indoor temperature fluctuations.

different for each house and for each night in the summer, but the manner in which the two will vary will follow quite closely the tendencies shown in the figure. The following points are especially worthy of attention:

1. Ordinarily the maximum outdoor air temperature occurs at approximately 3 p. m.
2. The minimum outdoor air temperature occurs at approximately 4 a. m.
3. The maximum indoor air temperature will occur several hours after the outdoor air temperature has reached its maximum value. Ordinarily the indoor air temperature will reach a maximum value between the hours 7 to 9 p. m.
4. In an uncooled and unventilated house the outdoor air temperature will probably be below the indoor air temperature after the hours of 6 to 7 p. m.
5. The extent to which the indoor air temperature can be reduced during the night will depend on the amount of ventilation of outdoor air introduced indoors as well as upon the extent to which the outdoor temperature drops during the night.
6. The greatest amount of night air cooling possible is that in which the indoor air temperature is reduced to the same value as the minimum outdoor air temperature. This amount shall be arbitrarily considered as 100 per cent effectiveness in night air cooling.
7. The minimum indoor air temperature will probably occur at about from 6 a. m. to 7 a. m.
8. The indoor air temperature will show a steady rise for approximately 12 to 15

hours following the time at which the indoor air temperature attains a minimum value.

9. The extent to which the indoor air temperature will rise is dependent on:
 - (a) the construction of the house.
 - (b) the amount of ventilation of outdoor air during the day.
 - (c) the extent to which the outdoor air temperature rises during the day.
 - (d) the amount of heat liberated in the interior of the house during the day.

It may be noted that the desired results of "keeping cool" can be obtained if the following procedure is followed:

- a. When the outdoor air temperature has fallen during the evening hours to the same value as the indoor air temperature, large amounts of air should be introduced into the house. Ordinarily this would mean that the ventilation process should start at about 6 p. m. or 7 p. m. and should continue until about 6 a. m. or 7 a. m. of the following morning.
- b. The windows should be closed and the outdoor air ventilation should be stopped at 6 a. m. or 7 a. m. and whatever "coolness" that has been stored in the house should be conserved until the evening hours, when the outdoor air should again be introduced indoors.

How Many Air Changes?

The results obtained at the Research Residence in Urbana, Illinois, during the 1933 test season showed that the "effectiveness" of night air cooling was determined largely by the amount of outdoor air introduced. In other words, the greater the amount of air circulated through the house, the greater was the "percentage of effective cooling" that was obtained. Fig. 2 and Table 1 present results obtained in the Research Residence.

Table 1

Effectiveness of Night Air Cooling as Influenced by Number of Air Changes in the Research Residence

Number of Air Changes Per Hour	Effectiveness of Night Air Cooling in Per Cent
3	30
4	37
5	42.5
6	46.5
7	50.5
8	53.5
9	56
10	58
12	62
14	65
16	67
18	69
20	71
25	74.5
30	77
35	79

Note:

- (a) In order to obtain "number of air changes" (Continued on page 47)



The Frigidaire Air Conditioned House at the Century of Progress

THAT air conditioning has actually captured public interest is amply demonstrated at Chicago's Century of Progress where air conditioning displays of equipment and air conditioned restaurants, theaters, displays and buildings have very definitely pulled more than their share of interest this summer. These displays of equipment and air conditioned public places, range from displays of plain heating equipment of 1934 model to elaborate outdoor systems such as the skating rink and adjoining restaurant in the Black Forest Village.

One of the displays which has had a constant, day after day stream of interested visitors is the Frigidaire House—a completely air conditioned structure which shows the public exactly what a summer conditioning system looks like and how it operates. The house stands in a sunken garden at the north end of the General Motors Building. It is a conservative, simply furnished house designed for the needs of the average American family. The air conditioning system cools the air when it is too warm, dehumidifies the air when too moist, cleans

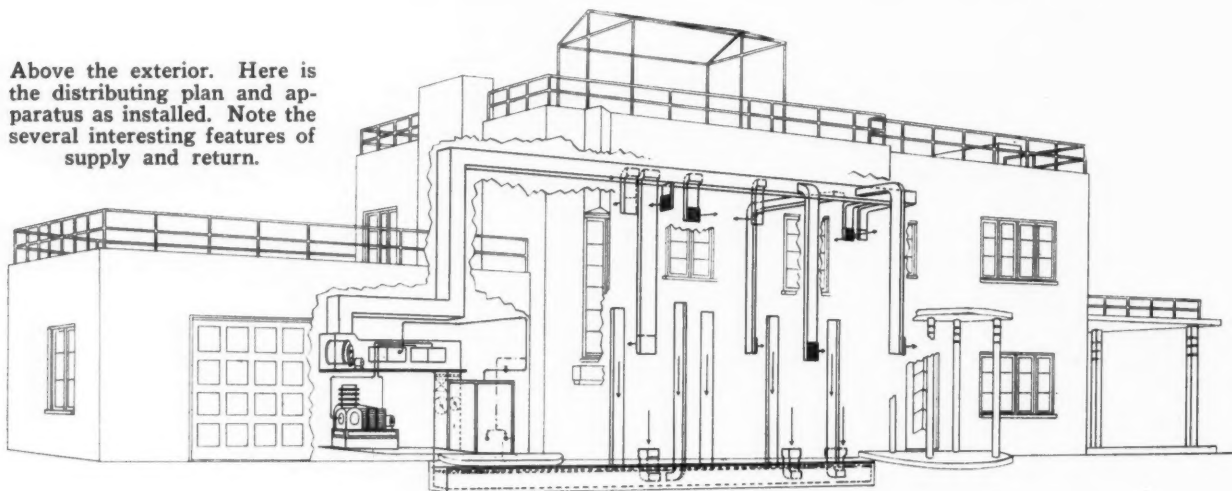
the air of pollen and dust, warms the air when it is too cold, cleans, humidifies the air in winter and circulates the air all the year round.

The details of the system are worth study. The air conditioning system was designed to take care of immensely larger crowds than would be encountered in the same size house used as a residence. Consequently the equipment as installed is not the same as for a normal condition of occupancy. When used as a residence, the air conditioning system* would consist of a 36,000 Btu. per hour condensing unit (3-ton size) with an evaporator of the same capacity. A fan capable of circulating approximately six changes of air per hour through the house would be used and of these six changes approximately one change per hour would be drawn from the outside. The above figures on capacity are based on an outside condition of 95° dry bulb and 76° wet bulb and maintaining inside conditions of 75° dry bulb and 50% relative humidity.

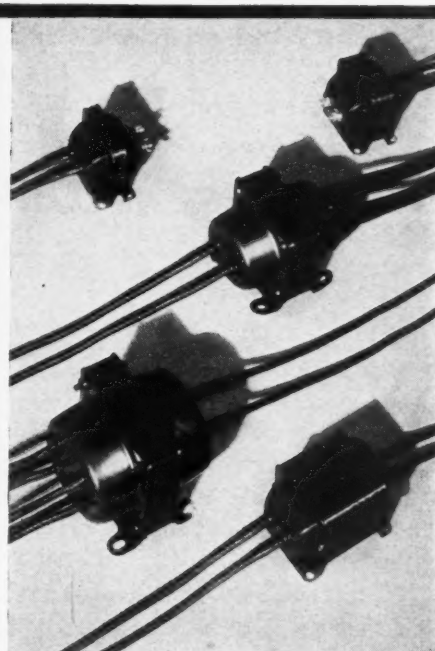
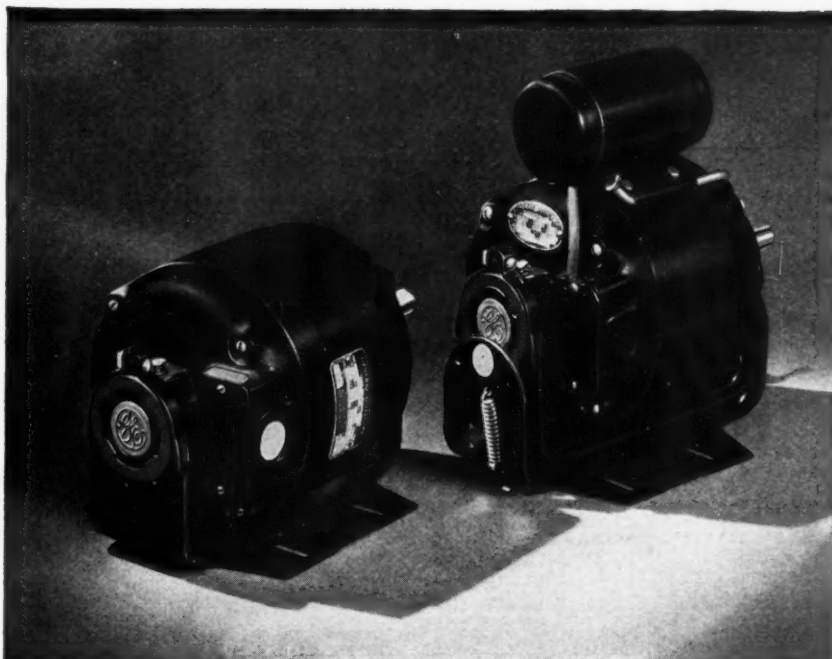
The direct losses from the house are extremely small, since all exterior walls contain 3½ inches

(Continued on page 49)

Above the exterior. Here is the distributing plan and apparatus as installed. Note the several interesting features of supply and return.



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TYPE KH resistance, split-phase motors for belt-driven fans and blowers requiring up to 1/4 hp.; Type KC motors for the same class of service where the horsepower required is from 1/3 hp. up (in the fractional-hp. range). Both have these advantages:

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This article concludes the discussion of automatic controls for air conditioning systems employing two speeds of the fan. Some current practice with this system is cited, together with some of the good and bad features and cost records discovered by installers.

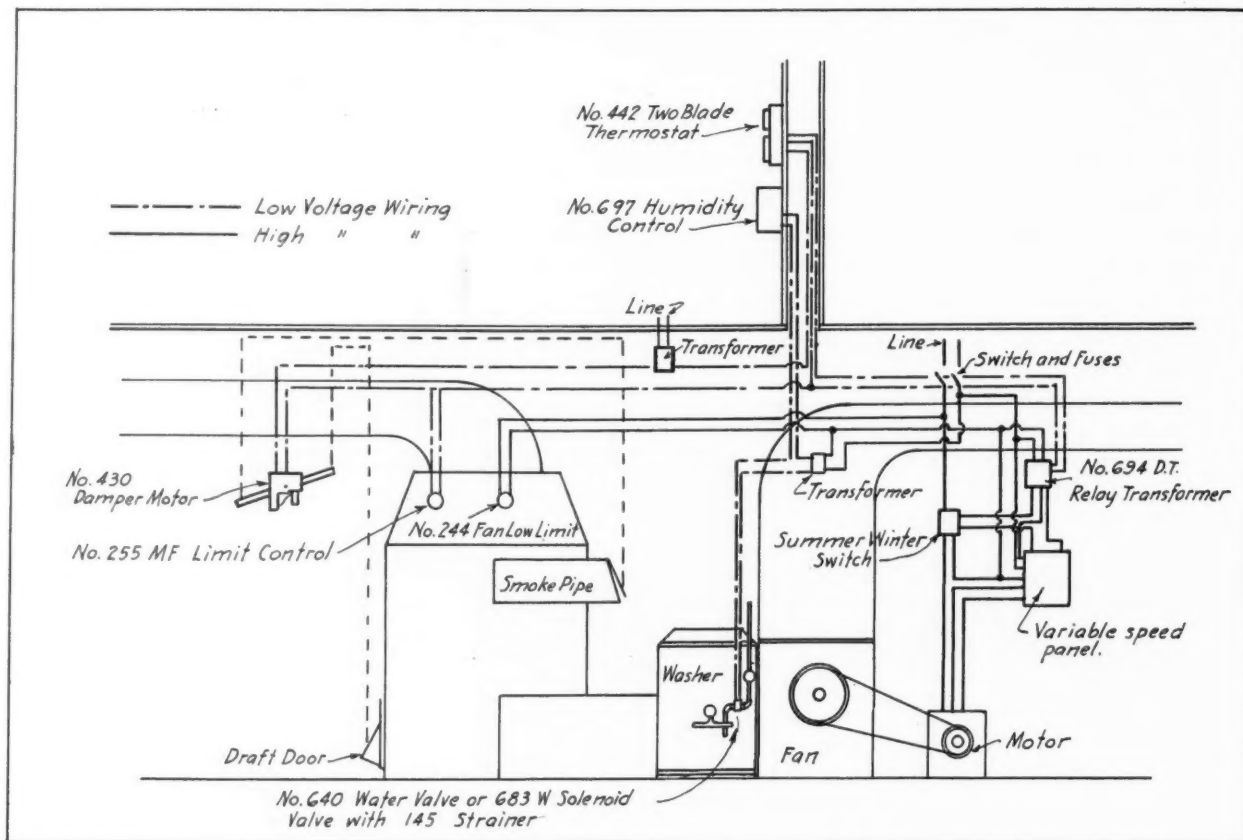
Automatic Control Systems In Air Conditioning

WE HAVE so far discussed the general operation of the system and pointed out how to make the settings for the fan control. There is another point, not directly related to controls, but of interest to those who have not used the system. It is—"what is the relationship between volumes of air at low and high speed?"

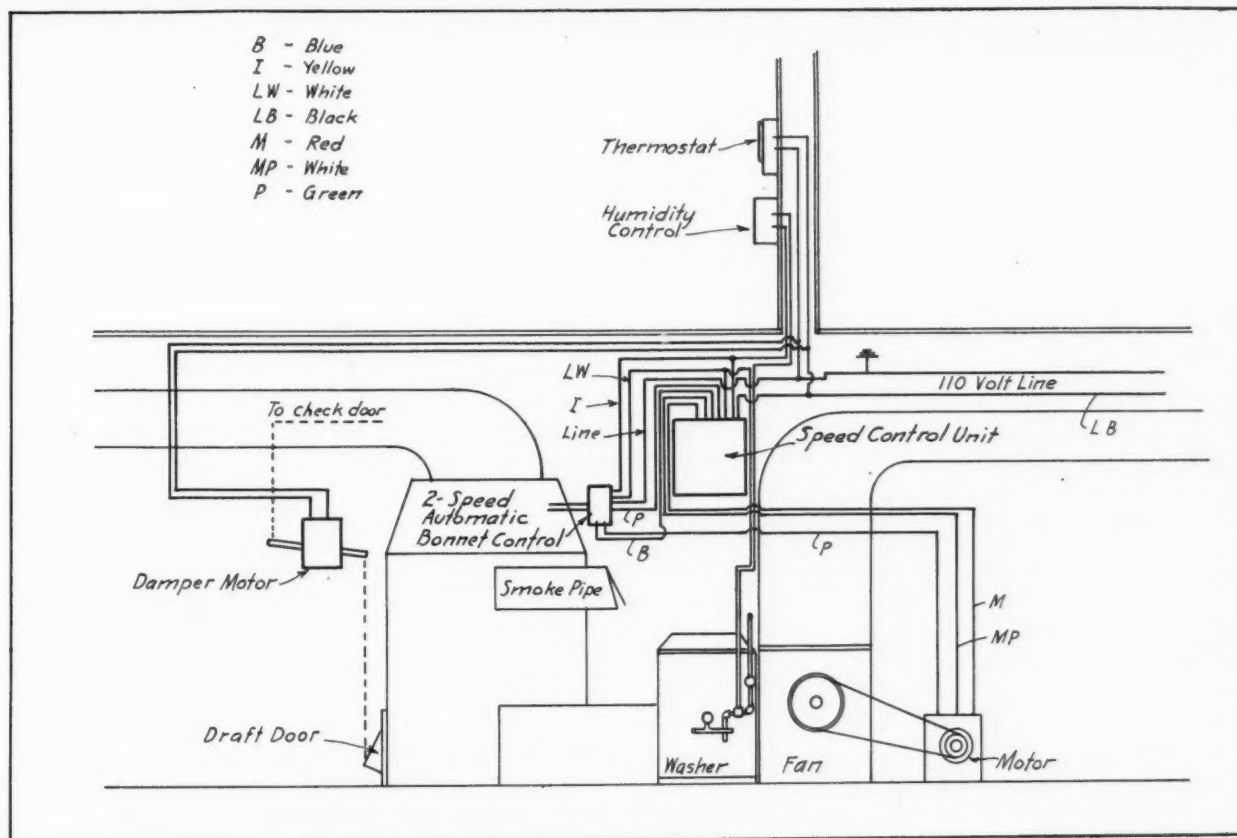
Questionnaires sent out to the industry indicate that there is little organized thought on this point as yet. So far as the high speed is concerned we can quickly settle the problem. The fan should deliver the c.f.m. required at the designed register air temperature to heat our house at zero degrees

outdoors (or in more southern sections at the outside temperature for which our system is designed). We may use high velocities and low register air temperatures or low velocities and higher register air temperatures, but the fan must deliver our designed c.f.m.

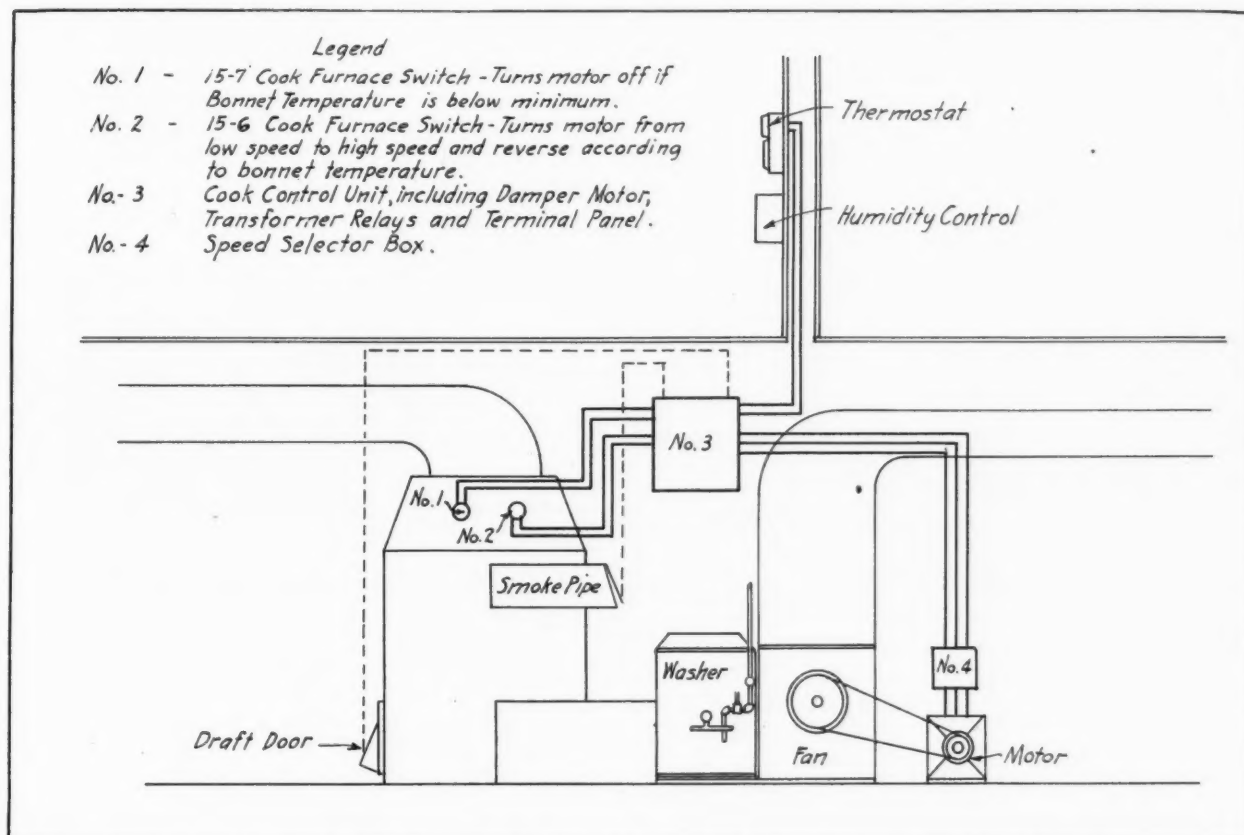
There are several bases for selecting the low speed volume. The first is air change. Suppose our designed c.f.m. gives six air changes per hour. We may arbitrarily choose three air changes as desirable for the low speed and wire our motor accordingly. In this case we attempt to do two things—maintain balance in our distributing system



The hookup shown here is popular in St. Louis. The apparatus consists of a two-bladed thermostat and the usual base-ment instruments. The thermostat controls both fan and fire. The operation is explained in the text, but the purpose of the system is to give close control over both fire and circulation. The apparatus shown is by Detroit Lubricator Company.



Emerson Electric Company, another pioneer in two speed fan operation, provides an eight speed selector from which three operating speeds (one for summer circulation) are chosen. The thermostat controls the draft and not the fan. Fan changes from slow to high and back to slow according to predetermined settings of a bonnet fan control.



Cook Electric Company make their two-speed apparatus easy to wire by placing the damper motor, transformer, relays and terminal panel in one housed unit, as shown. A low limit control is provided to stop the fan should bonnet temperatures get too low for room comfort. The fan runs on low or high speed according to bonnet temperatures.

and maintain constant air circulation throughout the house.

A second basis is to maintain balance regardless of anything else. We determine that a certain amount of air is required to maintain proportionate flow of air through our piping system. The low speed of the fan is set to deliver this amount of air.

A third basis is to eliminate stratification and heat cold areas. We are accustomed to think that when a good gravity system is operating on accelerating fire and just before the room thermostat is satisfied we should have a condition where all areas are comfortable and not too much stratification is found. Tests show that such a system produces just about three air changes per hour on gravity. But we may be dealing with higher velocities and higher or lower register air temperatures than we find on gravity so we must make some compensation.

One contractor suggests that he selects the room where he believes he will have most trouble from cold glass or cold wall areas, such as a sun room, and sets his low speed to deliver sufficient air to keep this room comfortable as long as possible on low speed delivery. Another, who uses high side walls on most of his forced air installations, states that he also selects a room with the most cold wall or glass area and sets his low speed at

some point where his air stream will at least start air movement toward these cold walls.

When we get down to facts, however, it would seem that the air change basis takes into account most of the results hoped for with the other two selections and is undoubtedly the easiest to establish. With air change as a basis (say one-half the changes on high speed) the contractor can make changes upward or downward as his tests on the job indicate.

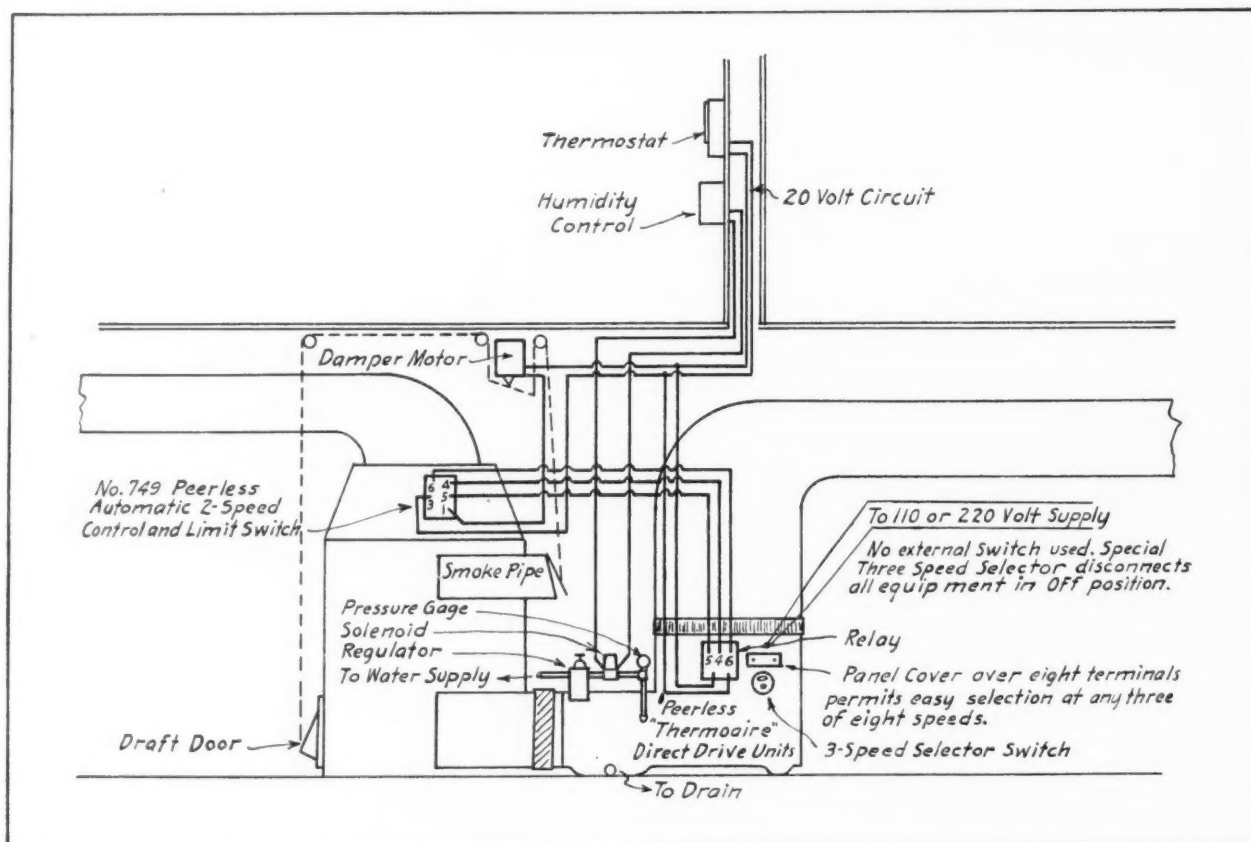
Typical Hookups

With these basic facts in mind we come now to the instruments available for control of variable speed operation. We should give some consideration to the instruments because on their characteristics depends to some extent how we will hook up our system.

We will briefly survey some current practice for this type of fan operation. In the St. Louis area quite a number of installations have been made with a variable speed motor and a two-bladed thermostat. The principle is for the room thermostat to control both fan and fire. A limit control is located in the bonnet or in a main duct and connected in the fan-damper motor circuit. Users say the system operates like this:

"The low limit switch is set as low as possi-

(Continued on page 44)



Peerless Electric Company has been working with two-speed fans for several years. This is the hookup they use. The room thermostat controls the draft door, and thereby combustion. The fan runs on slow speed until an open draft door builds up bonnet temperature to the high speed setting of the bonnet control, whereon the fan runs on high until the bonnet temperature is again reduced to the low setting.

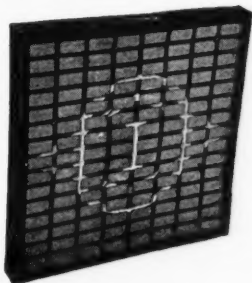
JUST 3... OF THE MANY

"GOLDEN STAR" FURNACE



But there certainly is a long list of air conditioning equipment that is available to you through the Osborn Company. In fact, everything that is necessary to complete a perfect forced air heating or air conditioning installation is in its warehouse, ready for immediate shipment.

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Illustrated are just three of the many items of air conditioning equipment available . . . and you are assured that these, as well as all others offered through the Osborn Company, have distinct individual merits, and are the finest for their specific purposes.

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Using the lines offered you through the Osborn Company means using—the newest type of equipment . . . that is easy to install . . . that is made of the finest materials . . . and gives years of unfailing service—these three features add up to just more PROFITS for you!

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Headquarters For Air Conditioning Equipment

THE J. M. & L. A.
OSBORN CO
—DISTRIBUTORS—
DETROIT-CLEVELAND-BUFFALO

We are air conditioning a radiator heated house. Stop for a minute and

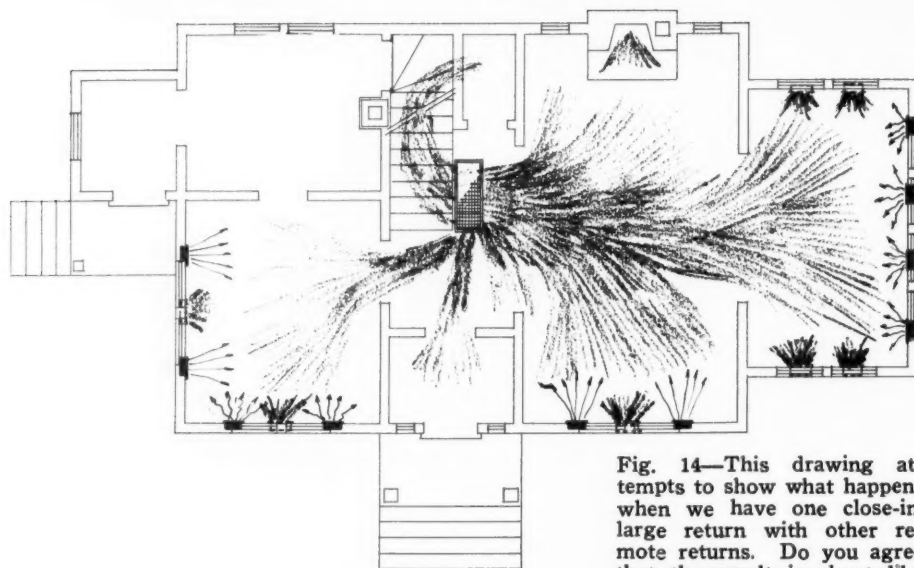


Fig. 14—This drawing attempts to show what happens when we have one close-in, large return with other remote returns. Do you agree that the result is about like this?

Let's Talk About Inlets and Returns

In applying air conditioning to houses heated by radiators there is always the problem of where shall we place inlets and how many returns shall we use. We have the same problem in furnace heating, of course, but in radiator heated houses we can't tear up all the floors and walls. You might like to add a few suggestions?

By Platte Overton

IN designing an air conditioning system for the house in Fig. 6, it will be recalled that the owner desires to remove the radiators in rooms 101-102-104 and heat and air condition these rooms with an indirect system.

The subject of design is interesting and possibly much could be said about the matter, but here our problem is fairly simple. The house is already built, and this fact will control our design to some degree. The owner would protest wrecking this house for the installation, so the general layout must not be disturbed and the removal of plaster for the installation of stacks will not be considered.

The question of the location of inlets and returns is always of concern. Most engineers and designers have their own pet theories; some the result of considerable experience, others plain guess-work. That much research is still required regarding the location of inlets and size and design of the register or grille, is obvious.

The writer, in making the following statements regarding returns, has no desire to start a controversy. These ideas regarding returns are no theories. They are the result of considerable experience and observation and will be discussed in future articles.

The statement in brief is that: with the proper size

and required pressure drops *the location of returns is not important.*

The industry from the start has set a precedent of one or two returns from every room. In actual practice it is found that a majority of such returns fail to work. In a 10 or 12-room house, with 10 or 12 returns it is safe to wager that not more than 2 or 3 of these returns are working to any extent. It is true that such return stacks seem to be functioning. For a given second floor room with an inlet supply, say of 150 c.f.m., the average outside wall return stack, with a 14x15 return grille, carried across the basement in the joist space and topped into the top of the return trunk line, will carry about 10 to 15 c.f.m. by actual test.

Comparing this 10 or 15 c.f.m. with the supply of 150 c.f.m., the necessity of the installation of such a return may be questioned.

The writer believes that this performance of the return system is due to a law in physics. This law may be termed *momentum*. The majority of heating men and designers seemingly believe there is primarily no difference in the return and supply system, so they design them very much alike and attempt to defeat a natural law by the use of volume dampers.

The writer, like all designers, is prone to design

AIR CONDITIONING

Questions and Answers

Cooling Calculations American Artisan:

In referring to the cooling data sheet presented in the January and March issues of American Artisan I find several things on which I should like to have additional information.

First of all, the data sheet seems to be worked out with a 10° difference in temperature between the atmosphere of the outside and inside of the house, requiring 17,059 Btu's to drop the temperature 10°. Your calculations on page 39 then immediately proceed to cool the house not 10° but 20° or from 80° to 60°, calling for a circulation of 790 cu. ft. of air per minute.

Near the bottom of the page, in discussing the method of cooling with water sprays, "The pressure of the water at the nozzle will be approximately 5 pounds per square inch per gallon per nozzle per minute, so for 2 nozzles 7½ pounds will be needed. Please elucidate that point.

Then on page 40, in which you are figuring out the area required if cooling coils are used, I notice that instead of 17,059 Btu's apparently 25% has been added to give a figure of 21,324. I am curious to know how you arrive at the factor of 25% increase and why it wasn't used in the previous calculation.

Farther down the page you state 55° water at the sprays or in coils and an allowable rise of temperature of 10°, etc., that you would use 2,132 lbs. of water per hour. If the air is to be cooled to 60° just how can you permit or figure on a 10° rise in the cooling water?

Under the paragraph dealing with refrigeration, I am interested to know how you arrive at the figure of 400 gallons of cooling water.

Then on page 41, quoting another sentence, "The weight of water to be used, cooled to 25°, in order to store up refrigeration during a period of 10 minutes, etc." Instead of water, wouldn't you use brine in this case, or would the water be in such rapid circulation that it wouldn't freeze?

In the last paragraph we notice the circulation of 72.3 lbs. of air per minute or 964 cu. ft. per minute; whereas, in the first set of figures a requirement of 59.2 lbs. per minute or 790 cu. ft. per minute circulation was shown. Part of this difference, of course, is due to the 25% increase as mentioned earlier in the letter, plus the increase in the specific heat from .24 to .2467. Is there

anything else that we should know in this connection?

We are also curious to know if you intend to take up the matter of the absorption of latent heat in a future issue? In problems of this nature, dropping 80° to 60°, wouldn't there be considerable latent heat to be taken care of in addition to the sensible heat?

H. C. S., Illinois.

Reply by Professor H. J. Macintire

In comfort cooling there are always two considerations in the problem; namely, that of the dry bulb temperature and that of the weight of moisture present in the air. If a temperature of 80° F. d.b. and 45% relative humidity are desired, then the dew point temperature must be maintained at about 56.8° F. and enough heat removed per minute or per hour so that the dry bulb temperature in the room will read 80° F. Of course the amount of heat to be removed depends on the difference of temperature on the two sides of the building, which was taken as 10° F. in the comfort cooling problem in question.

In absorbing heat, the method used in comfort cooling is to circulate air which has been cooled by being brought in contact with a cold surface or a cold spray of water (or brine, in the case of some cold storage warehouse work). The amount of heat that can be absorbed by a pound of air at a constant specific heat depends on the temperature rise of the air, and if the room temperature is kept at 80° F. we could bring air in at 75, 70, 60, 50, or even lower temperatures, but the danger, as the temperature is lowered, is that a draft will give a chill, so a nominal temperature for the entering air is desirable. On the other hand, if the humidity is to be controlled, the weight of water vapor must be kept constant at 69 grains per pound of dry air, in this problem, corresponding to a dew point temperature of 56.8°.

If ice water at 35° F. is available, undoubtedly the air passed through the refrigerator coils can be cooled to some temperature in the neighborhood of 45 deg. F. or less, and the water vapor content will be that corresponding to a dew point temperature of 45° F. or 44 grains per pound of dry air. In the Research Residence at the University of Illinois, a by-pass damper is used so that by mixing some air at 80° F. with cooled

air at about 45° F. the desired temperature of 60° at the register faces can be obtained. It will be seen, therefore, that the excess moisture was condensed out by depressing the temperature of the air leaving the coils which, in turn, can be controlled by varying the amount of cold water pumped through the coils. You will note that the problem involves "sensible" heat, which is absorbed by a rise of air temperature, and "latent" heat, which involves condensation of water vapor (steam). The latent heat was found to be approximately 25% of the sensible heat load in the Research Residence, tests on which are the most elaborate and complete of any ever attempted. Calculations involving fan capacity are based on sensible heat, but where refrigeration, amount of cooling water, surface of cooling coils, etc., are involved, the sum of the latent and the sensible heat is required.

In cooling fluids using surfaces we can permit a counter or parallel flow of the cooling medium. The counter flow has the advantage of cooling the air or other fluid closer to the initial temperature of the water, so that if deep well water at 55° F. is available, with a 10° rise of temperature, it should be no difficult problem to cool air down to 60°. The counter flow method is used in all heat exchangers, or where a minimum temperature is required.

In the calculation of the number of cubic feet of air required per minute or per hour, it was shown that a number of quantities for the fan capacity could be used, being inversely proportional to the allowable temperature rise of the air. In the same manner, the amount of water to be used in the sprays can be varied, depending also on the allowable temperature rise. If the amount of heat to be absorbed by the water is 21,400 B.t.u. per hour and the rise of temperature is taken as 5° F., then the number of gallons of water to be supplied per hour will be $21,400 \div 5 \times 8\frac{1}{3} = 513$. If 400 gallons are selected, then the temperature rise will be 6.4° F. If sprays are used to supply the chilled water in a spray chamber, the number of nozzles to be used will depend on the quantity of water to be used, the water pressure at the nozzle, the design of nozzle, and the size of opening. Capacities should be taken directly from the manufacturers' tables.

(Continued on page 69)

A Simple Air Conditioning System For An Operating Room

AIR conditioning is very helpful with patients undergoing an operation, observations at the Norfolk Protestant Hospital, Norfolk, Virginia, have shown. Patients withstand the surgical shock much better and they rally far more quickly, when the room is kept at a comfortable temperature and humidity.

Since the installation of air conditioning equipment a little more than a year ago, Miss Ruth B. Epperson, who is in charge of the operating room, has been making a careful study of surgical patients, noting their condition while under the influence of anesthesia and then the effect after they have recovered consciousness. She has done this, because she has been particularly interested in the use of air conditioning and because she was convinced that the enervating atmosphere that is encountered in the Virginia seaport during the summer



was sapping the vitality of patients and lowering their chances for a successful operation and a speedy recovery.

The surgery of this hospital consists of three rooms, with a central hall leading into one room, and the other rooms on each side of the hall. When it was decided to install air conditioning, a careful study of the requirements was made and it was decided to install a duct system, with the compressor safely away from the rooms, where there could be no possible chance of a friction spark from moving parts igniting anaesthesia gases.

(Continued on page 43)

EXTRA MONEY— INSTALLING

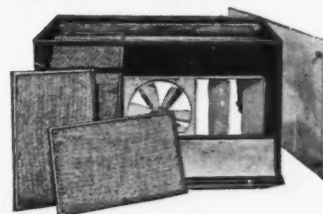
**Air
CONTROLS INC.**

FORCED AIR HEATING EQUIPMENT

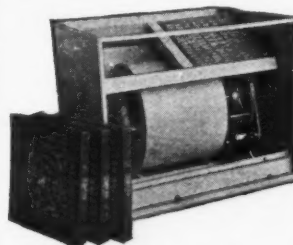
Any furnace man can pick up many a job where a heating plant is already installed by putting in an Air Controls forced air heating accessory. The public is thinking about air control; wants it; will buy it. The home owner who may not be able to afford complete air conditioning equipment *can* afford to install an Air Controls unit that will give more heat—cleaner heat—and at the same time save money on fuel. Air Controls is the complete forced air heating equipment line. Whatever the requirement, Air Controls will meet the need. Dealers, wholesalers, furnace men, are finding it very profitable to handle and feature these units.

AIR PACKAGES

This fan type Air Package is ideal for the gravity heating system already in. Has the famous Miles Automatic Furnace Fan with red by-pass louvres—three-speed control—over-sized filters. All enclosed in a neat, compact casing with removable access panel for top or back cold air inlet. A very popular unit.



FAN TYPE



BLOWER TYPE

Among larger homes, small public buildings, garages, school houses, etc., you will find a big market for this blower type Air Package. It is quiet—compact—easily installed even when there is a fire in the furnace. A real leader in the forced air heating field.

"AC" BLOWERS

The Air Controls line of blowers is of the same high type of efficiency and dependability. Manufacturers of special Air Conditioning units will do well to examine this splendid line of newly designed blowers.



BLOWER

**SALES REPRESENTATIVES WANTED
DESIRABLE TERRITORIES AVAILABLE**

AIR CONTROLS, Inc.

1935 W. 114th St.

Cleveland, Ohio

Announcing— NEW DAMPER REGULATOR

Type B-22 meets a definite need for an improved damper motor at a low price.

It is a new and simplified unit, of heavy and rugged construction, quiet in operation, and priced (to the trade) \$13.50. The price covers *everything*—motor, attractive thermostat and all accessories.

It is powered by a small, four-pole induction motor operated at 16 volts. Small power transformer is mounted outside the housing, with approved cord and plug attachable to any light socket. Motor is equipped with basement switch. Listed as standard by Underwriters' Laboratories.

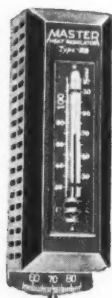
These are the barest facts—not enough for one in your position. You should fully inform yourself concerning this new development. Write us today for details.

**Price
to Dealer
\$13.50**



WHITE MANUFACTURING CO.
2362 University Avenue ST. PAUL, MINNESOTA

MASTER HEAT REGULATOR

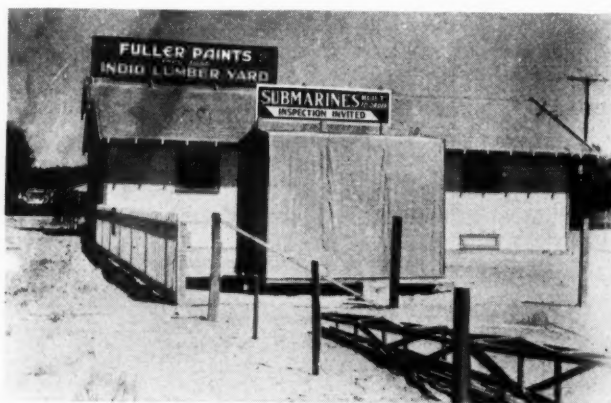


Type B-22
Two Position

Air Conditioning By Means of a "Desert Submarine"

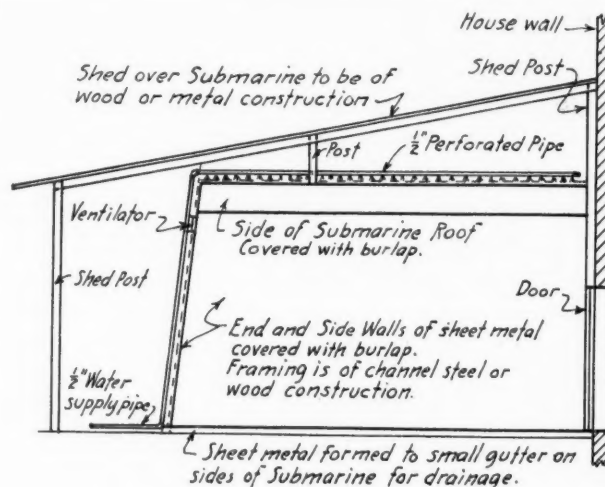
OUT in Indio, California, 22 feet below sea level, where the desert sun beats ceaselessly on the glaring sands of what was once the bottom of an arm of the Gulf of California, the rail-roader with a nightrun and the hard rock man from the Colorado River Aqueduct tunnels are giving thanks for the advent of the desert "submarine." Day sleepers were out of luck under Indio's sweltering sun until a local man conceived the idea of these enlarged canteens.

With a framework of either light wood or metal channels, the sheathing of the submarine is of sheet



These desert submarines are displayed and sold as packaged units. Here is one displayed in the yard of the originator.

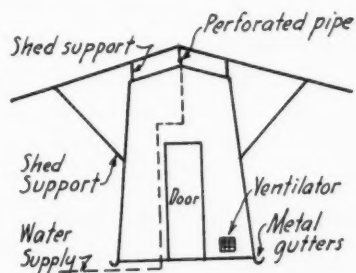
metal, with the lower edges formed into small gutters below the sloping sides. A small opening is usually made at one end near the floor and at the opposite end near or in the roof, for ventilation, and the metal sides, end and roof are covered with burlap. This is kept moist by the drip of water from perforated pipes strung along just above the roof and connected to a water supply line. A barrel is used if running water is not available. One pipe along the comb of the roof is usually enough.



Type For Use In Rear of House

Evaporation keeps the interior of the submarine about 20 degrees cooler than the regular temperature of the day.

A shade for the room is essential. If the submarine is attached to one side of a house a sloping shed is constructed of lumber or sheet metal, with two or more posts to support the outer end and others resting on the submarine roof. A door is made from the submarine into the other living room, and it is sometimes used to lower the temperature of the remainder of the home by drawing



Type For Use Alone

The submarine can be built onto an existing house or built separate. The separate unit is constructed as shown here.

out the cool air with a fan. If the submarine is used alone the shed is supported by posts on the roof, and by light angle braces attached to the framing of the sides. The Indio Lumber Yard was quick to take advantage of the popularity of the new type of underwater desert craft, as will be seen by the photo.

Operating Room Cooling

(Continued from page 41)

The equipment selected was Frigidaire, with a duct leading along the main hall and into each of the operating rooms, so arranged that the rooms might be air conditioned and ventilated quickly and thoroughly.

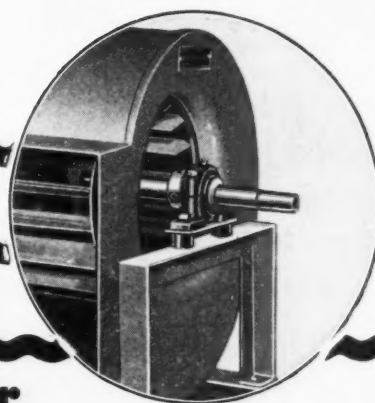
The effect was noticeable immediately, not only on the patients but on the doctors and nurses comprising the hospital staff, according to Miss Epperson.

"Not only did the air conditioning equipment add to the comfort of the doctors and nurses during their work, but it had a marked effect on the condition of the patient throughout the operation due to the lowered humidity," says Miss Epperson. "In addition, we notice that it clears up any odors that may accompany an operation. Since installing this equipment, we have noted a greater degree of efficiency on the part of those working in the operating rooms.

"During the warm summer months we were able to maintain a temperature difference of at least 12 degrees on an average.

"We use the air conditioning unit even during the winter months in order to bring the rooms down to the proper temperature quickly. The temperature of an operating room should be between 70 and 80 degrees."

"PEP" for the Warm-Air System



"Sort of sluggish!" is many a furnace owner's comment on his heating system. Three types of prospects need powered circulation:

1. The inadequate or inefficient system, troubled with distant cold areas and spotty heating.
2. Practically all systems during the spring and fall heating seasons.
3. Practically all systems in the mild winter zones.

You sell COMFORT, ECONOMY and HEALTH with the "Buffalo" H.V.A. Blower—a trio of strong sales appeals.

The "Buffalo" is QUIET, essential to a satisfactory installation. This is due to low tip speed, rubber padded bearings of the bronze and graphite-lined sleeve type, and to the die-formed inlets.

Ease of installation cuts labor and costs.

The wide need for positive air circulation, independent of gravity, is a real opportunity for profitable sales immediately and in increasing volume.

Interested contractors and dealers will find the "Buffalo" line of Blowers specially engineered for this service; "HVA" also, "Buffalo" cooperation is geared to the needs of the warm-air heating field.

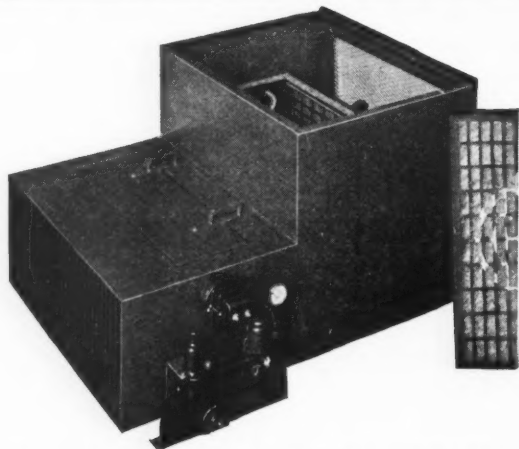
"Buffalo"
"HVA"
FANS

Ask for detailed information which will be sent promptly.

BUFFALO FORGE COMPANY
497 Broadway Buffalo, N. Y.
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Peerless MULTI-SPEED BLOWERS

**Proved Best By Thousands
Over A Five-Year Period**

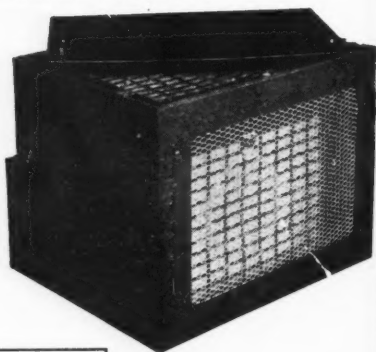


Peerless Thermoaire Units



**Peerless Pioneer Automatic Two
Speed Bonnet Controls.**

**DIRECT DRIVE
MULTISPEED
BLOWER FILTER
UNIT**



**Blower Unit
Removed from
Cabinet**

**Special units
to manufacturers'
specifications.**

Peerless
THE PEERLESS ELECTRIC CO.
Fan and Blower Division
WARREN OHIO

Automatic Controls

(Continued from page 36)

ble, perhaps as low as 100 or 105 degrees, depending on the job. The two-bladed thermostat is set at the room temperature desired, say 72 degrees. Starting from a cold furnace (as would be the case with gas or oil or coal in mild weather) the temperature in the bonnet is below 100 degrees so the fan cannot operate. The thermostat causes the damper motor to open the draft and the fire accelerates. As soon as the bonnet temperature reaches 100 degrees the fan starts on high speed raising the room temperature to 70 degrees (the setting on the other blade of the two-bladed room thermostat). At this point (70 degrees) the damper-motor closes the draft. If the bonnet temperature has reached a point above the high setting of the limit control during this period the damper will already have closed. The fan continues to operate until room temperature reaches 72 degrees at which point the fan drops back to low speed.

"As the room cools down the fan will be turned on at high speed just as soon as the temperature falls below 72 degrees. If the room temperature continues to fall the damper motor will open the draft as soon as the room temperature reaches 70 degrees."

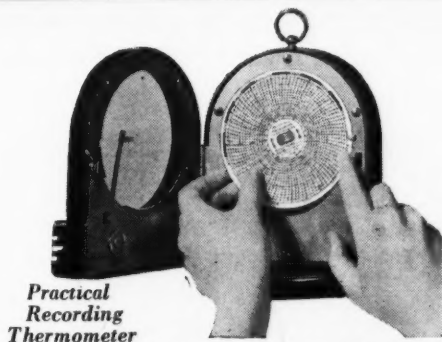
Bonnet Fan Control

It should be obvious from the description above that the contractors using this system and particular apparatus are interested primarily in maintaining an even temperature in the room. The fan is started and reduced to slow speed on a range of temperature of plus and minus one degree (two degrees total). The fire, likewise is controlled through a range of two degrees (70 to 72 degrees) by the thermostat so close control is anticipated.

For the control system referred to in the first part of this discussion, the apparatus consists of a variable speed motor, bonnet control of the automatic, two-speed type, a relay and a room thermostat. The room thermostat controls the fire through the damper motor. The thermostat has no connection with the fan. The fan is controlled by the two-speed fan control located in the bonnet or a main duct.

The system operates as follows—room thermostat calls for heat, fan is running on slow speed. Thermostat causes damper motor to open draft, accelerating fire. Bonnet temperature rises to high speed setting of fan control whereon the fan speed is changed to high speed. Room thermostat is satisfied and draft closes. Fire decelerates, bonnet temperature drops below high speed setting of fan, fan reverts to slow speed.

Two problems must be watched in using this control system. The fire can gain so much mo-



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HERE'S PROOF of heating performance

A written record of heating performance after your equipment has been installed is proof of correct operation. Use the Practical Recording Thermometer to forestall complaints, aid collections and insure satisfied users by providing an accurate 24-hour chart of temperatures anywhere in the building.

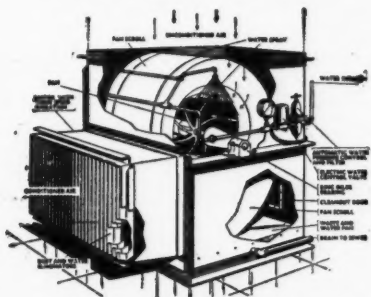
Invaluable, also, in securing prospects and in closing sales. With a Practical Thermometer you visualize for your prospects the great difference between ordinary and controlled heating.

Especially designed for every day use in the field, Practical Thermometers are sturdy, accurate and simple to use. Priced so low you can't afford to be without. Write to Department 101 for full details and description.

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AM-PE-CO AIR WASHER-BLOWER

Washer-Blower in ONE Unit —at single-unit cost



—4 years of proven superiority on actual jobs

90% Greater Actual Cleaning Efficiency

New exclusive Am-Pe-Co "double washing" feature cleans air twice — first as it passes through the sprays, then scrubs it in its vortical movement through the scroll. Tests show almost 90% greater cleaning efficiency. You get BOTH forced air and air conditioner in ONE unit. Saves cost, saves space, makes better job than ordinary double installations. Investigate now.

Send for detailed literature and dealer prices.

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CLIMATOR Air Conditioning Equipment

Time-tested air conditioning systems in a range of capacities to take care of any job in a way that will build business for you.

CLIMATOR No. 2 consists of separate washer, filter and blower of specified capacities.

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CLIMATOR No. 4, blower and filter only, is a competitively priced unit built in two sizes, for smaller homes.

CLIMATOR is the complete line of PROVED efficiency.

FURNACES

Most Complete Heating Line in the Industry

Return-flue type furnaces, cast iron, single and double door.

Double radiator furnaces, cast iron, self cleaning. Particularly adapted for oil.

Gas-fired furnaces, steel and cast iron — gas-fired boilers, steam and hot water.

Registers—grilles—furnace pipe and fittings. Horizontal tubular heaters—wood burning furnaces—tank heaters—garbage burners. Steam and hot water boilers, coal or oil.

Why not buy all your heating stock from one house, whose products have been standards of quality for 77 years?

*There is a Mueller Jobber near you.
Write us to put you in
touch with him.*

L. J. MUELLER FURNACE COMPANY
2005 W. Oklahoma Ave., Milwaukee

*Jobbers note: A few good territories
are still open. Inquiries invited.*

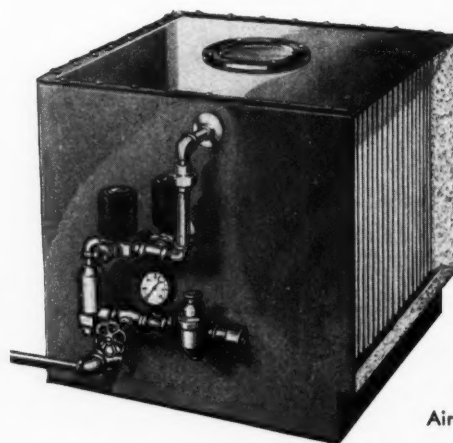
MILWAUKEE

FURNACE FAN AND AIR CONDITIONER



TYPE C
Arrangement 2
Furnace Blower with Motor

The Type C furnace fan, less the casing, can be furnished for furnace manufacturers or sheet metal contractors desiring to fabricate their own casings or to incorporate the fan assembly in installations with the air conditioning unit. Also, component parts of the fan assembly consisting of the housing or wheel alone are available.



Domestic
Air Conditioner

The new Domestic Air Conditioning Unit equipped with automatic control valves allowing spray and washers to run only while blower is operating. The most compact and practical unit on the market. Sold separately for assembling with blower units or to go with present blower installations. Also sold in combination with blower unit in housing.

THE BISHOP & BABCOCK SALES CO.
CLEVELAND, OHIO

mentum that by the time the room thermostat is satisfied a condition may prevail which will keep the fan running at high speed for some time after the room thermostat is satisfied, thereby causing room temperature over-run. Secondly, under poor firing, there may be some lag in time between the time the room thermostat calls for heat and the bonnet temperature increases so the fan can run on high speed.

To offset the trouble with over-running room temperature we can fall back on past experience and insert a bonnet or stack limit control in the room thermostat-damper motor circuit. We will set this limit control for a "high" at a temperature determined by test as high enough to permit continuous high speed operation of the fan, but low enough so that the fan will quickly exhaust the high temperature air after the room thermostat is satisfied and has caused the draft to close.

The question may be asked—"how about cost?" A variable speed motor costs somewhat more than the usual single speed type. With regard to cost of operation—comparing intermittent operation of a single speed motor and fan with the nearly constant operation at low or high speed of this system for 24 hours, we have some figures which indicate that in an average sized installation the variable speed ran just under 8 hours on high speed and 16 hours on low speed on a near zero day. This fan

supplying 1500 c.f.m. at the high speed and 1050 c.f.m. at the low speed used 300 watts per hour on high speed and 140 watts per hour on low speed. In the area tested electric power costs 3 cents per kilowatt so the cost would be $8 \times 300 \times .03$ plus $13 \times 140 \times .03$ divided by 1,000 equals 14 cents per day or \$4.20 a month.

The Research Residence staff has reported that on intermittent fan operation on a 10-degree above zero day, the motor consumed 3 kilowatt hours of power which at 3 cents per kilowatt would be 9 cents, while a continuously operating fan at high speed consumed 3.6 kilowatts of power at a cost of almost 11 cents, both for a 24-hour period.

So our power costs are not far out of line, when we consider a larger motor and fan.

To summarize, we may say that in view of the faults found in intermittent fan operating system, nearly constant or constant fan operation is desirable.

We can maintain constant flow of air throughout the house; we can maintain a balance of air delivery through our supply system; we can reduce or eliminate stratification; we can offer constant cleaning; we can prevent such troubles as drafts, breathing, cold areas with a constant flow of air which need not be our full c.f.m. delivery by using a reduced fan delivery.

Night Air Cooling

(Continued from page 31)

per hour" substitute proper values in the following equation:

Air changes per hour

Cubic feet of air circulated per minute $\times 60$

— Volume of space in cubic feet

(b) Effectiveness of night air cooling is a term for the ratio of b shown in Fig. 1.

a

(c) An example of the use of the table is presented here.

Assume that the indoor and outdoor air temperatures crossed each other at 7 p. m. at a value of 83 deg. F. Assume also that 10 air changes per hour circulation was maintained during the night until 6 a. m. Furthermore, assume that the minimum outdoor temperature during the night was 65 deg. What was the minimum indoor air temperature at 6 a. m.?

From the table it may be noted that the "effectiveness for 10 air changes per hour was 58%. Then 0.58 (83-65) is 10.5 deg. which is the amount which the indoor air temperature decreased from 83 degrees. The minimum indoor air temperature was then 72.5 deg.

(c) If in this same example, 20 air changes per hour had been circulated during the night instead of 10, then the decrease in indoor air temperature would have been 0.71 (83-65) or 12.8 deg., and the minimum indoor air temperature at 6 a. m. would have been 70.2 degrees.

Effectiveness in Terms of Air Change

It may be noted in Fig. 2 and from the values shown in Table 1 that the effectiveness of night air cooling increased quite rapidly with each increase in air change per hour, when the total number of

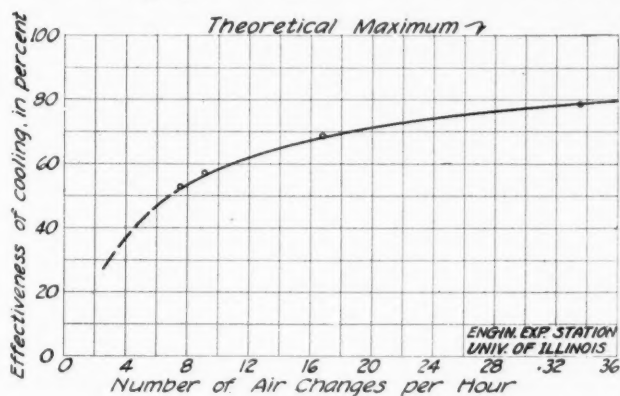
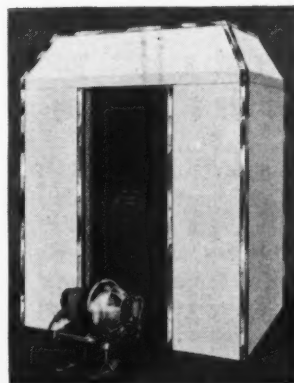


Fig. 2—This chart shows the effectiveness of night air cooling in relationship to number of air changes.

air changes was small, but that the increase in effectiveness gradually diminished as the total number of air changes became larger.

For instance, by increasing the number of air changes from 5 per hour to 10 per hour, the effectiveness was increased from 42.5% up to 58%, or

BARD OIL
Air Conditioning Furnace**More Efficient****Beautifully Designed****All-Welded**

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This furnace has better design—more eye-appeal than the ordinary furnace and sells correspondingly faster. People want attractive basements. They get this in the Bard, as well as saving $\frac{1}{3}$ fuel costs.

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Write today for full details. You will find it a furnace that, due to its unusual merits, will prove a good profit-maker for you. It is built for low fuel cost; for good appearance; and for long, trouble-free service.

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Mr. **DEALER**
Mr. **CONTRACTOR**

The Better Housing Program of the National Housing Act Recommends—
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In More than 65,000 Homes is Saving Fuel and Proving a Great Convenience.

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New Low Prices make it possible to sell a "Cook" with every furnace or boiler installation.

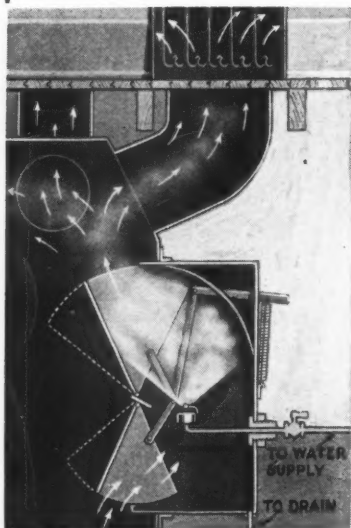
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A Simplified and Improved
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The Hum-O-Zone is the most efficient humidifier ever offered. Makes any warm air furnace deliver exactly the correct amount of moisture. Does not depend entirely on heat for evaporative action, thus giving correct humidity at any temperature furnace may be operating.

No pumps, valves or other mechanism to get out of order. Low first cost. Water only cost of operation.

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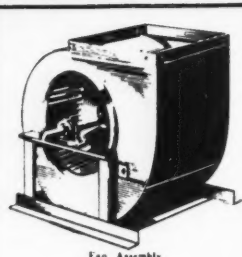
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and CONDITIONING
EQUIPMENT that
make your sales easier

CLARAGE has much to offer you as a source of supply for furnace fan wheels, complete fan assemblies or air conditioning equipment.

We have been in this business almost a quarter century. Clarage products are the result of experience, research and sound engineering. And the line is complete, with suitable types and sizes to meet every capacity, operating speed and service condition.

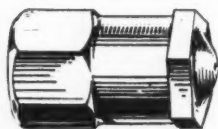
Many leading furnace manufacturers have standardized on Clarage. It might pay you to do the same. At least investigate! **CLARAGE FAN COMPANY**, Kalamazoo, Michigan.



Fan Assembly.



Double Multiblade Wheel.



Straightway Nozzle.
PATENT PENDING

CLARAGE
Air Handling and
Conditioning Equipment

an increase of 15.5%. However, when the number of air changes was increased from 20 per hour to 25 per hour the effectiveness was only increased from 71% up to 74.5%, or an increase of 3.5%. This condition of "diminishing returns" imposes a practical limit on the extent to which the air circulation can be increased in any given installation.

Give and Take Choice

Practically speaking, therefore, a compromise must be reached between securing the highest possible effectiveness of cooling and circulating a reasonable amount of air. In the University of Illinois tests it was decided that a minimum number of air changes of 17 per hour should give good results in practice. Obviously, a larger air circulation than 17 air changes per hour would be more effective, while a lesser air circulation than 17, although less effective, is not necessarily to be ignored. In fact, in some cases it will be necessary to utilize a smaller air quantity than 17 air changes per hour, and in these cases the redeeming feature will be that "a little is a great deal better than none at all."

Table 2 has been added to this paper to facilitate the calculation necessary to find the required air delivery in cubic feet per minute for any desired number of air changes per hour. See the example attached to the table.

Table 2.

Cu. Ft. per Minute Required for Desired Number of Air Changes

Air Changes Per Hour	Cubic Feet per Minute. per 100 Cubic Feet of Space
1	1.67
2	3.33
3	5.00
4	6.67
5	8.33
6	10.00
8	13.33
10	16.67
12	20.00
14	23.33
16	26.67
18	30.00
20	33.33
25	41.67
30	50.00
35	58.33
40	66.67

Note:—In order to obtain the C.f.m. required for any given number of air changes, multiply the value in the second column by the number of hundreds of cubic feet of space.

Example:—Required number of air changes per hour = 12. Space to be ventilated = 17,500 cubic feet, or 175 units of 100 cubic feet per unit. C.f.m. per 100 cubic feet of space, from table = 20.00. Total C.f.m. required = 20 times 175 = 3,500 C.f.m.

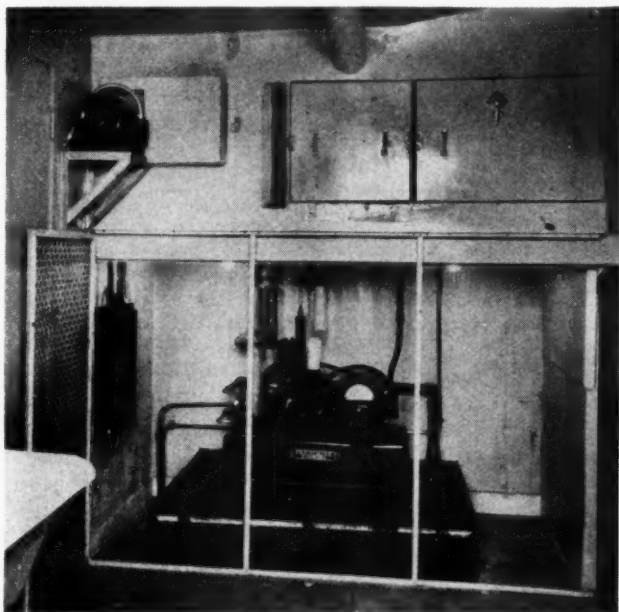
Frigidaire House at Fair

(Continued from page 32)

of Johns-Manville, Type B, home insulation (3½-inch rock wool blankets). The ceiling of the second floor is treated in a similar manner and there is, in addition, an air space between second floor ceiling and roof which gives further insulation. All windows throughout the house, with the exception of those in the front door, are double panes with a sealed air space between. This reduces the heat loss or gain, as the case may be, and, in addition to this, each window is provided with an awning to protect it from the direct rays of the sun. Similarly, the roof is painted white so that it will have the maximum possible reflection of solar radiation.

Heat supply for winter time is from a boiler connected to a heat exchange surface placed in the main duct off the cooling apparatus. Circulation is by "draw-through" system using the same blower which circulates air in summer. The winter heating system is automatically controlled from an instrument panel.

The sketch of the system shows several interesting features. Air is returned from all rooms through baseboard registers and stacks which are



A 3-ton size condensing unit is placed in the garage. This size unit is large enough for the house in normal occupancy.

brought down to a main collecting duct beneath the floor. Note that there is no basement under the house and all heating and cooling apparatus is located in a first floor heater room and the garage. Equally interesting is the supply system which is overhead type. All air, whether in winter or summer, is brought up to the space between the second floor ceiling and the roof and carried across the attic floor in one main supply duct. From this main duct stacks lead down to inlets placed in the side walls (all on inside partitions).



Compared to the Vacuum Sweeper, Radio and Electric Refrigeration, *Air Conditioning*, a child of the depression, has made amazing progress, and you, as the heating and ventilating authority in your territory, should play the leading role in this new industry. With the National Housing Act pouring out money for home "modernization" and the public's desire for air conditioning, you are in a splendid position to cash in, especially with Emerson Equipment available at lower prices than ever before.

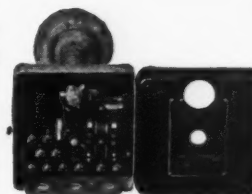
EMERSON Multi-Speed FURNACE BLOWER

Quietness is essentially of extreme importance on forced air heating or air conditioning installations. Emerson furnace blower construction assures quiet operation. The motors are especially designed for silent operation and the special spoke and rubber mounting absorbs vibration. The cabinets are treated with a sound-proofing compound to deaden the air rush noise through the housing. The motors have no brushes, starting device or sliding contacts to wear or interfere with radio reception.



Only Multi-Speed Blower with 2-Speed Automatic Bonnet Control

Regulating blower operation by bonnet temperature gives the Blower greater flexibility, greater efficiency, and prevents the building up of excessive temperatures inside the furnace casing, which may result in injury to the furnace. It also prevents the circulation of unheated air when the casing temperature drops below a predetermined minimum.



Improved Bonnet Switch for EMERSON FURNACE FANS



The new improved Emerson bonnet control switch for furnace fans is a simple device, yet positive in operation and easy to adjust. When used in connection with the 3-speed Emerson Furnace fan regulator, the fan can be made to operate automatically on any two of the three speeds by casing temperature.

Write for complete information on Emerson Air Conditioning Equipment.

WRITE FOR CONSUMER ADVERTISING PLAN

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ELECTRIC MFG. CO.

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Leaders in the Fan and Motor Industry Since 1890

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A New Lau Blower-Package Unit—complete with filters, motor, Furnastat, canvas connections, drive and blower cabinet . . . in sizes to handle from 13,000 to 35,000 cu. ft. of space or gravity pipe area of 525 to 1,300 inches.

AT A NEW LOW PRICE

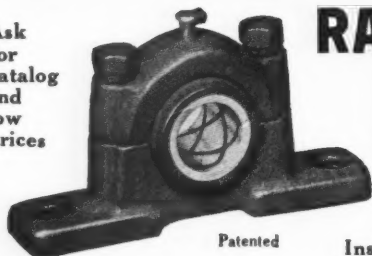
which makes air conditioning available to every prospect, which puts you in position to cash in on real business.

Write at once for full details. Don't miss a day of this sensational chance to "get on" a winner.

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609-613 WEST LAKE STREET CHICAGO, ILLINOIS

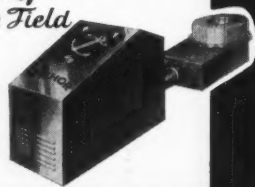
Insist on Randall Pillow Blocks on all blowers, fans and air-conditioning units. Get longer, trouble-free service.

Randall Pillow Blocks have no equal—be sure to specify them.

Anchor KOLSTOKER

Best engineered stoker on market today. Attractive design appeals to eye; economy and performance appeal to purse. Easily installed in any heating plant now in service. Designed for homes, churches, green-houses, hotels, apartments, schools, laundries, dry-cleaning plants, factories, store-buildings, etc. Made in 17 sizes; complete coverage from homes to 400 h.p. boiler plants. Tremendous sales possibilities for wide awake distributors and dealers. Write for full information.

10 Years Ahead
of
The Field



PAT.
PEND.

ANCHOR STOVE and RANGE CO. INC.
NEW ALBANY ESTABLISHED 1865 INDIANA

New England House

(Continued from page 29)

ference with soil pipe, stairs and a centrally located chimney of large dimensions. With this cramped effect it was necessary to make many bends otherwise avoidable, but headroom of ample height was maintained nevertheless. As shown in Fig. 4 three warm air supplies were taken off each of the four bonnet elbows to try to make as balanced a looking job as possible. In two instances it was necessary to separate these pipes in order to let soil pipe and water pipes pass between them.

No definite attempt was made in the design of the system to establish a precise inside corner supply and outside wall return for each of the rooms as against an outside wall supply and inside wall return system. A combination of the two as best suited to the structural features of the house was adopted. (See floor plans.)

SECOND FLOOR PLAN

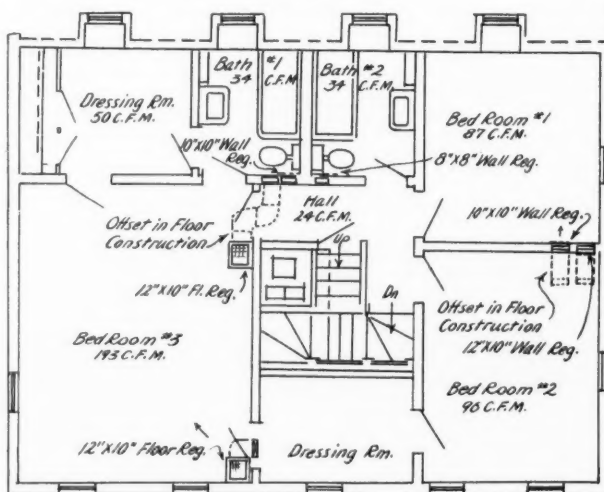


Fig. 3—The second floor plan shows one or two registers in each room, no returns and a number of cross-overs.

First floor construction with steel beams into which the floor joists framed so that the top of the steel beams was directly under the rough floor made it impossible to poke ducts up into the walls above as is the common practice. For that reason it seemed desirable to adopt floor registers throughout the first floor.

Return air for the system was taken back from three locations in the house, namely, the living room by the porch door, the dining room by a rear door, and the front hall to take care of the second floor of the house.

Control System

The thermostat, as shown in Figure 2, is located in the living room. A furnacestat of the mercury switch type is located in the furnace bonnet. It actuates the fan of the air conditioning unit so that the fan comes on at 160 degrees in the bonnet and goes off at 120 degrees.

The cycle of heating operation which takes place with this system is as follows: If the room thermostat is set to maintain 70 degrees in the room and the temperature drops to 68 then the thermostat actuates the solenoid valve on the oil line,

opens it and permits the modulated set amount of oil, .4, .5, .6, .7, .8 of a gallon per hour to pass to the burner. The added combustion of oil raises the temperature of the combustion chamber and thence the furnace bonnet temperature. If the fan "high" and "low" temperature switch in the furnace bonnet has been set for the fan to come on when the bonnet temperature reaches 160 degrees and to go off when the bonnet temperature drops to 120, then, in the cycle of operation, when the bonnet temperature reaches 160 degrees the fan starts and forces warm air through the system. When the temperature in the room reaches 72 degrees the thermostat shuts off the solenoid valve in the oil line, the combustion chamber temperature drops because less oil is burned, the bonnet temperature drops to 120 and the fan stops. The temperature in the room drops to 68 again and the same cycle of operation takes place.

Two tests were made, as shown in diagram of Fig. 5, at this job with an anemometer to make a set of the branch dampers to balance the air flow from each outlet with the theoretical amount figured to be necessary for each room. With the second set of the dampers each room seemed to be satisfied for the season—Spring, and although the total C.F.M. of air recorded did not measure up

Balancing the job by Anemometer

	Room	Required C.F.M.	Register Size	Gross Reg. Area, sq. ft.	First Test Vel.	First Test C.F.M.	Second Test Vel.	Second Test C.F.M.
First Floor	Living Room	104	12"x10" Front	0.83	97	81	81	67
		105	12"x10" Rear	0.83	145	120	128	106
	Dining Room	77	12"x10" Side	0.83	67	56	72	60
		51	10"x8" Rear	0.56	92	51	83	47
	Kitchen	81	12"x10"	0.83	78	65	108	90
Second Floor	Toilet	19	8"x8"	0.45	123	55	80	36
	Hall (First)	58	10"x10"	0.70	115	80	90	63
	Hall (Second)	24						
	Bed Room #3	97	12"x10" Front	0.83	18	15	63	54
		96	12"x10" Rear	0.83	102	85	110	91
	Bed Room #1	87	10"x10"	0.70	122	85	85	60
	Bed Room #2	96	12"x10"	0.83	56	47	90	75
	Bath #1 and Dressing Room	84	10"x10"	0.70	156	109	91	50
	Bath #2	34	8"x8"	0.45	110	50	90	40
	Total C.F.M.	1013						833

Fig. 5—This data sheet was prepared from data secured in two tests. The author says the second setting of dampers was satisfactory last spring, but we would say the results are quite a bit short of the engineering needs, and that the results seem rather erratic.

to the theoretical amount no effort was made to speed the fan up.

Air flow was measured by moving an anemometer over each register face two inches away from the face and recording the velocity. The gross area of the face was applied to this velocity and the resultant C.F.M. recorded. The outdoor temperature when the test was made was 48 degrees.

The only means provided for summer cooling is by circulation of air in the house. The total C.F.M. of air moved by the blower is sufficient to effect four changes of air per hour in all the rooms. Complete recirculation of the house air may be made, or, air may be taken from the cool cellar by opening a door in the filter box in the cellar and permitting the fan to take its air from that source.

Sensational!

New FURBLO Units are amazing the entire industry!

New Series 50 and Series 60 units combine complete air circulating and air cleaning, including Blower, Motor, Filters, Casing and Furnacestat at sensationally low prices. Can be sold completely installed in some cases for under \$100. Dealers everywhere are cashing in big with this complete, compact, guaranteed Air Conditioning money-maker.

Get Complete Data At Once for Quick Profits

LAKE SIDE COMPANY HERMANVILLE MICHIGAN

MONCRIEF Air Conditioning Humidifier

No. AC-10

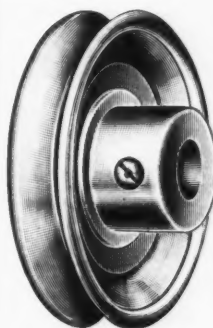
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To Dealers



Automatic. Adaptable—fits any round or rectangular, pitch top or straight side casing. Cast iron pan rust resisting finish presents extra large evaporating surface. Simple quiet valve easily adjusted for any amount of water. Air seal cover an improved feature.

The Henry Furnace & Foundry Co.
3471 E. 49th St. Cleveland, Ohio



MAUREY UNIVERSAL V STEEL PULLEYS

Specify these perfect Steel V-pulleys—strong, true, attractive—for GUARANTEED satisfaction on all blower and air conditioning drives. Also, on all drives where V-Belts are used.

Made in 2 Types

All smooth rolled edge pulleys

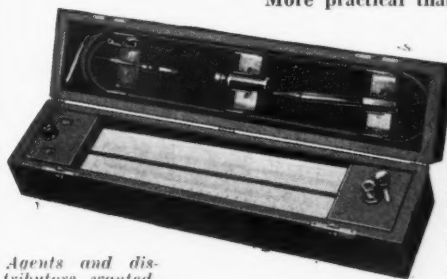
Type "A"—For 1/2" "A" belt from 1 1/2" to 13 1/2" O. D. Light duty.
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More practical than a draft gauge or anemometer.



Agents and distributors wanted.

It reads velocities as low as 140 ft. per min. No complicated figuring to determine C. F. M. Special pitot tube furnished for taking total and static pressures. Eight graduated readings for each .01 inch pressure and velocity. Full range 0 to .5.

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BALMI-AIRE**BLOWER FILTER UNIT**

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SUPREME HUMIDIFIERS

**Electric Controlled
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Dealers' Cost \$11.40.
Includes humidifier, electric valve and water line connections.
HUMIDISTAT—\$8.70
110 Volts—60 Cycle.
On oil, gas or fan installations, spray operates only when furnace is heating.

SUPREME ELECTRIC PRODUCTS CORP.
79 Mt. Hope Ave., Rochester, N. Y.

Electric Valves for Gas—Water—Oil

Let's Talk About Returns

(Continued from page 39)

for cooling in the summer time, and this item will also influence our design to some extent. While cooling we must deliver air at 55-60 degrees, and as we plan to use baseboard inlets, it is important that these inlets be designed to propel the inlet air upward and outward.

The location of these inlets in room 101 are shown. The arrows at the inlets in Fig. 14 merely indicate the various typical air movements of the air with various designs of register or faces.

In locating these inlets, no thought has been given to their influence over glass surface, infiltration, or cold outside walls. Their number and type are planned for diffusion of the warm or cool air over the entire area.

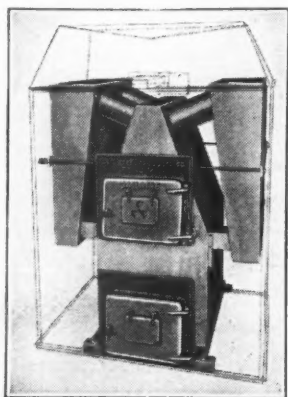
One of the reasons for the location of the inlets in the baseboard is ease of installation. It is only necessary to remove the baseboard and quarter round moulding and a careful workman may install such inlets with little or no dirt or mess.

The Solarium with its high heat loss and comparatively small cubical capacity would have a high air movement if it were not part of the living room with a low heat loss and low air movement.

For summer cooling the air inlets should be high in the side walls or ceilings. Our walls and beams prevent the installation of stacks hence we must assure the distribution of the air at the inlet and keep the velocity of the floor return low enough to keep from pulling the cool air back to the conditioner before it has effectively done its work.

The owner wishes to cool two bed rooms on the second floor alternately with the three lower rooms. Basement sills prevent us from running stacks to room 201, but they may be installed for rooms 202, 203.

Our heating system is vapor and on the data sheet Fig. 13 we note that the air supply in c.f.m. (item 27) gives us a total of 884 c.f.m. for rooms 101, 102, 104. While rooms 106, 206 are really part of this area due to the open stair way, we eliminate them in the calculation as the direct radiation will remain on the stair landing.



Coal Unit

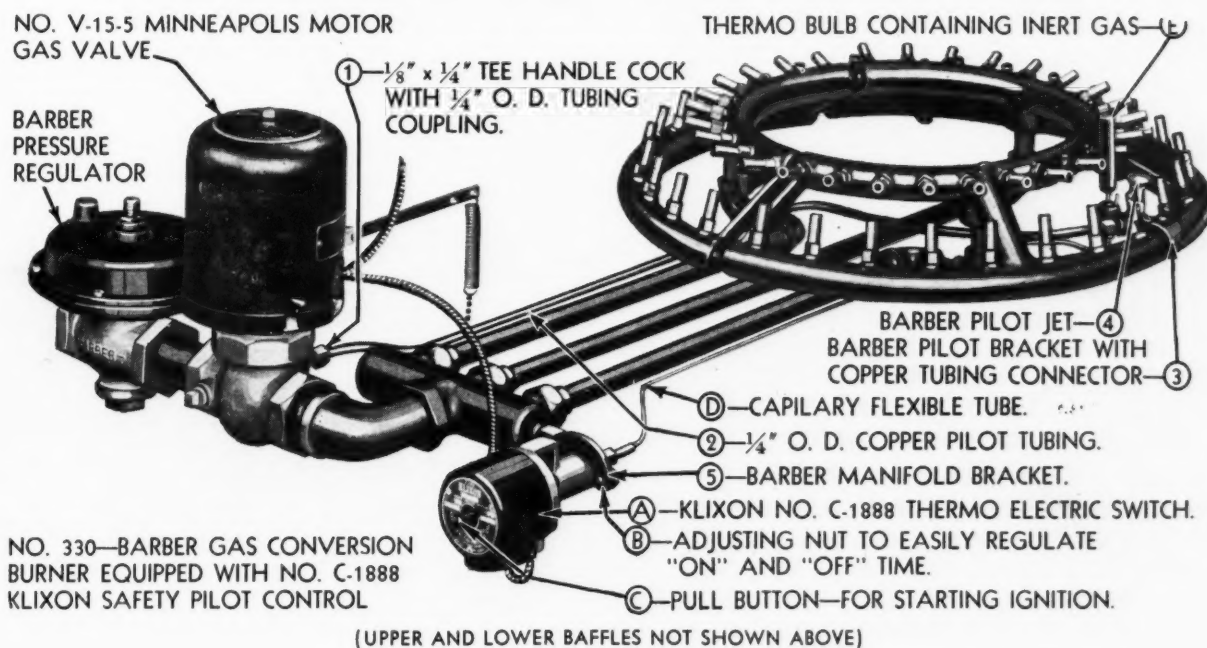
Dailaire
SYSTEMS OF HEATING AND AIR CONDITIONING
The Line That Offers The Dealer
SOMETHING DIFFERENT TO SELL
The Dailaire is not just another furnace copied after all other furnaces—it is designed for greater efficiency—less floor space—better appearance—with all phases of air conditioning for all types of fuel.
You would not buy a 1910 automobile today—There is no more reason for selling a 1910 design of furnace—Write for complete agency plan while your territory is still open.

DAIL STEEL PRODUCTS CO.

1050 Main St.

Lansing, Michigan

Study These Basic Improvements in BARBER BURNERS



THE Barber Burner illustrated above will acquaint you with the many betterments recently incorporated in this already dominant Automatic Gas Burner—the first Conversion Burner on the market to receive the official Approval of A. G. A. Testing Laboratory. To the recognized, accepted features of Barber efficiency, such as the improved Barber Jet, the Barber Pressure Regulator, and the adaptability of Barber tailor-made assemblies to suit and fit furnaces or boilers, other Barber improvements have now been added.

Three new sizes are now available, furnishing accurately fitted assemblies for all grate diameters from 12" to 34" inclusive. Further refinements have been made in the jets which effect quieter operation without reducing flame temperature. For thoroughly reliable control, Spencer Klixon No. C-1888 Safety Pilot is now used.

These progressive features stand as further evidence that Barber maintains its leadership in the Conversion Burner field. Remember that Barber supplies especially designed units for warm air heating in connection with air conditioning. Be sure to write today for New illustrated descriptive bulletin and Revised Prices covering the above improvements.



Illustrating a No. 324-B Barber Automatic Burner installed in a round combustion chamber. Note the proper position of the burner; its simplicity of installation and the excellent heat-producing scrubbing action of the flame.

BARBER GAS BURNER COMPANY
3704 Superior Ave. Cleveland, Ohio

BARBER Automatic Jet Gas BURNERS

● For Warm Air Furnaces, Steam and Hot Water Boilers ●

ZONES ON FORCED AIR SYSTEMS NOW INDIVIDUALLY CONTROLLED



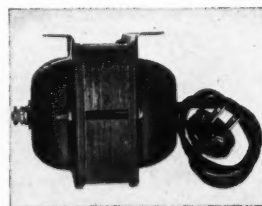
Various room exposures, effect of wind velocity, the radiant heat of the sun—no longer cause discomfort in the home heated with forced air. For "Genuine Detroit" Zone Control makes possible the individual control of temperature in each zone!

Zones may be comprised of one or more rooms, each zone with its own main duct. "Genuine Detroit" Zone Control regulates the flow of air through the duct, holding the duct damper open until the zone thermostat is satisfied. Overheating in one section of a house while another is underheated is thus prevented. The last thermostat to be satisfied shuts off the heat. The first thermostat that calls for it, turns on the heat—without interfering with the temperature of other zones where temperature is satisfactory.

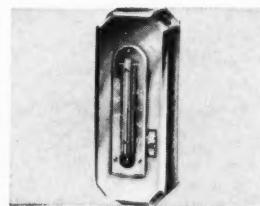
Even small homes with forced air systems now can enjoy the comfort of even, closely maintained temperature in each room, for the "Genuine Detroit" system of zone control is inexpensive and easily installed. No. 454 Low Voltage Thermostat, No. 431 Motor Unit and a transformer comprise the Zone Control unit. The unit also is provided with manual stop pin and post for holding the damper open to permit the operation of the circulating system during the summer.

There is no motor noise in a "Genuine Detroit" Zone Control installation, for the motor unit is absolutely silent. It is quickly and easily attached directly to the duct. The two-wire system eliminates any complicated electrical hookup in the individual zone thermostat circuit. There is profit now in Zone Control for forced air systems. Write for details today. Ask for Bulletin 66A.

(above) No. 431 Motor Unit



No. 836 Transformer



No. 454 Low Voltage
Thermostat

DETROIT LUBRICATOR COMPANY

DETROIT, MICH., U. S. A.

Canadian Representative: Railway & Engineering Specialties, Ltd.,
Montreal, Toronto and Winnipeg

...the problem corner

Smoke Pipe Problem

American Artisan:

Will you please advise me if there is a preparation made to preserve smoke pipe on furnaces, such as oil or something of this kind

R. D. K., Georgia.

Reply by
The Editors

We are not acquainted with any material of the type you mention. There are some materials which are resistant to rust and others which are resistant to acids such as found in smoke fumes, but whether these materials have proved satisfactory under your conditions we do not know.

Can any reader give any information?

Register Temperature

American Artisan:

I wish to let you know that the articles by Platte Overton on air conditioning and mechanical heating are appreciated very much and I think a help to anyone who will take time to study them. Personally, I feel that forced air heating has come upon the industry so rapidly that some of us have not been able to keep up.

I should like to be informed exactly what is the approved method of selecting the desired register air temperature?

A. A. K., Illinois.

Reply by
The Editors

Generally speaking, register air temperature is chosen in relation to the number of air changes per hour which we want to take place within an enclosed space. The lower the register air temperature, the more air we must introduce into the space and hence the more air changes required. The higher the register air temperature, the less air we must introduce, hence a smaller number of air changes.

The number of air changes recommended is optional and varies with the individual, but the industry today considers six air changes per hour good residential practice. We may have as few as four or as many as seven.

When the heat loss for all rooms has been determined, you choose the register air temperature by selecting a

temperature which gives about six air changes per hour. In an average installation the temperature now used runs from 120 to 140 degrees, although some contractors are working at higher temperatures.

New System?

American Artisan:

I have been a reader of *American Artisan* for some twelve years and would like advice on a subject bothering me.

One of my competitors has what he calls a new and improved system of installing gravity furnace systems. He places his warm air registers as close as possible to the furnace and the cold air returns along outside walls. However, instead of bringing his cold air back to the furnace through pipes, or between joists, he simply puts one or more cold air boots on the furnace with filters in them; in other words, the cold air is supposed to find its own way back to the furnace from the registers.

Do you think this system is healthful? None of these basements is used as living quarters, but isn't there a chance to spread disease from dirty, damp basement floors? Will there not be a back draft through the cold air registers when the basement door is opened? Are not these installations against the Standard Code?

B. H., Michigan.

Reply by
The Editors

We believe we are safe in saying that the type of return air system mentioned in your letter has been pretty well discounted as a satisfactory heating system by most of the contractors in the field. The system originated with Holland Furnace Co., who first cut through returns and dumped the air into the basement in order to use their unit air conditioner, which is attached to the furnace. You are probably familiar with this. Our understanding is that Holland did not find this system satisfactory and they tried to remedy the return operation by hooking the return air grille to a rectangular duct which was carried down to within a few inches of the basement

floor. This system has not proved very satisfactory.

From tests we have made on one or two of these systems and from questionnaires we sent out to contractors a year or so ago, we believe we are safe in saying that the chief fault of the system lies in the following facts:

1. The system is contrary to the "tight" return air arrangement found most satisfactory by the University of Illinois.

2. It is practically impossible to balance up return air, as house drafts, open windows and doors will tend to make some returns function while others are inactive.

3. The system is probably clean and healthful enough in a house heated with gas or oil but should not be recommended for systems using hard fuel.

4. The system lays the house open to the accumulation of basement odors which rise through the return air registers, and in some cases this is quite serious.

5. Most manufacturers of unit air conditioners of the type of Premier and Meyer recommend returning the air from the rooms directly to the fan by ducts in order to produce satisfactory recirculation.

6. In some codes and cities, such as Fort Wayne, Indiana, inspectors have condemned this system because of additional fire hazard. You might get some information on this by writing C. E. Tharp, 3509 South Harrison Street, Fort Wayne, Indiana.

The system was thought originally to save cost, but how much can be saved over an average return air system where a sheet of iron is nailed across joists is problematical.

In the Southwest a large number of contractors use gas furnaces with the bottom of the casing open and cold air faces set in the first floor. These systems seem to work all right, except that in that territory good basements, such as we know them up here, are few and far between and the contractors report some difficulty with dirt and dust. However, it may be said in favor of these systems that the air velocity across the basement to the furnace is so slow that an anemometer will not pick it up and suspended dust tends

(Continued on page 62)

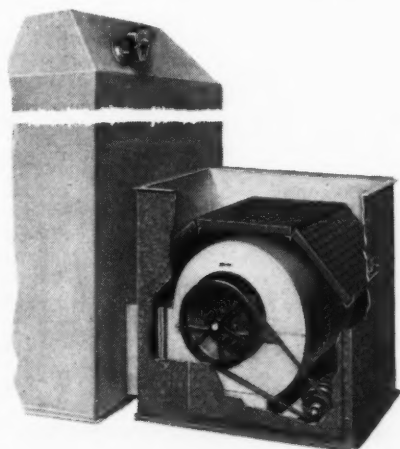
New PRODUCTS

For your convenience a number has been assigned each item on this page. A coupon will be found on page 71. Check the items you are interested in and mail the coupon to us. Complete information will be forwarded.

101—Furblo Blower

The Lakeside Company, Hermansville, Michigan, announces series 50 and 60 Furblo—a complete unit with blower, pulleys, belt, motor, filters, canvas connection, and housing—ready to install. The motor and blower are entirely separate from the housing and have no metal-to-metal contact. Universal self-aligning bearings, designed to maintain alignment permanently, are employed.

These new blowers are equipped with from $\frac{1}{8}$ to $\frac{1}{2}$ h. p. motors and in an average gravity piping system



with filters are said to deliver an actual C. F. M. of from 570 to 2460 C. F. M.

The company announces that it has introduced these blowers for the purpose of giving contractors units which can be sold to the home owner at astonishingly low prices.

Full information on the design, characteristics, dimensions, prices and terms are contained in a dealer price sheet and a descriptive leaflet which may be obtained from the company.

102—Water Valve

A water control valve, designed primarily for control of water for air conditioning and refrigeration work where the construction of brass will not be attacked by liquid or gas, is announced by Automatic Products Company, Milwaukee, Wisconsin.

The valve operates on the principle of employing a by-pass to open the main valve seat. When the solenoid coil is energized, the by-pass plunger is raised, in turn raising the valve stem which allows water to force the diaphragm down, opening the main valve seat.

Beg Your Pardon

In the New Products section of the September issue of AMERICAN ARTISAN a new furnace known as the "Comfort-maker" air conditioning system was announced as a product of Heating Systems, Inc., Joliet, Illinois. The correct name of this firm is The Joliet Heating Corporation, Joliet, Illinois.

103—Damper Motor

The White Manufacturing Company, St. Paul, Minnesota, announces a new and simplified damper regulator motor known as Type B-22.

The power unit of the motor consists of a small four-pole induction motor operated at 16 volts. A small power transformer is mounted on the outside of the damper motor housing and the entire unit is equipped with a cord and plug to be attached at any convenient lamp socket.

The motor is also equipped with a basement switch by which the ther-



mostat may be disconnected and the motor arms moved to "off" or "on" position during firing periods. The new damper motor is listed as standard equipment by the Underwriters' Laboratories.

The company will furnish an attractive thermostat and all accessories as a complete heat regulator unit under the name Type B-22 Master Heat Regulator.

104—Draft Blower

A forced draft blower for ashpit application, made entirely of cast iron with a sheet aluminum wheel on the fan and a dust-proof, induction-type motor for operation on 60 cycle A. C. 110 Volt current, is announced by the J. K. Mohler Co., Ephrata, Pa.

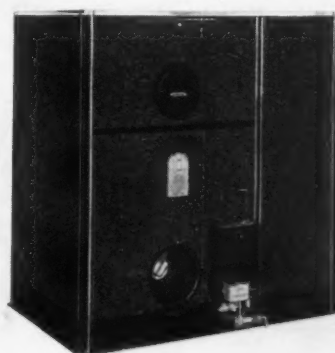
Features such as more air volume with less current, elimination of noise, absence of radio interference, are claimed for the unit. Cheaper grades of fuel may be burned, according to the manufacturers. Complete control apparatus consisting of a waterstat for

hot water boilers, a pressure switch for steam boilers and a room thermostat for all types of heating units have been matched to the blower and can be purchased as standard equipment

105—Air Conditioner

A new Model 140-E Superflex oil burning air conditioning heater is announced by Perfection Stove Company, Cleveland, Ohio.

The new unit consists of an oil burning furnace, filters, blower, humidifier



and complete control equipment. The furnace has a heating capacity of 115,000 Btu and comes in maroon baked enamel with stainless steel and black japan trim.

The blower is matched to the furnace and provides a steady flow of air while operating during the on cycle of the burner. Filters are fine steel wool coated with an oily film and are of the replaceable type. The humidifier is located in the bonnet and has a thermostatic control to maintain the necessary water level.

106—Unit Gas Furnace

The General Gas Light Company, Kalamazoo, Michigan, manufacturers of Humphrey gas equipment, announce a compact, low-priced heating plant—the Humphrey warm air unit.

The new unit is unusually small; the overall dimensions being 44 inches high, 28 inches wide and 37 inches long.

The unit is rated at an hourly input of 100,000 Btu and has an air delivery against 0.10 inches water gauge pressure of 850 cubic feet per minute. The outlet temperature is stated as 160 degrees.

The unit contains a direct burning, gas heating element with a blower operating at 480 R.P.M., enclosed in a single housing. The unit can be installed in the basement, attic or any convenient location.

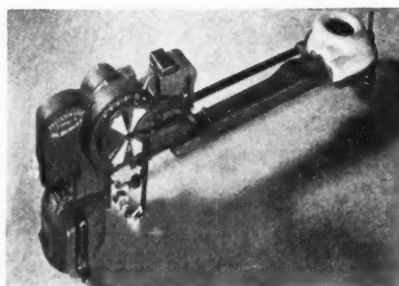
New Products

107—Arc Welder

General Electric Company, Schenectady, New York, announces a complete line of alternating-current arc-welding equipment including transformer units, electrodes and automatic welding heads. The new electric equipment is intended for heavy-current welding.

Slightly greater welding speeds are possible with this equipment and the company states that the making of fillet welds, corners or other intricate locations can be welded rapidly with the new apparatus.

The transformer units are available in three sizes having one-hour ratings of 500, 750, and 1,000 amperes. Primaries are wound for 220, 440, or 550 volts at 60, 50, or 25 cycles. The equipment is intended primarily for shop use.



air shutter, vaporization on patented hot plate, manual ignition.

Automatic control equipment consists of a graduated four-position thermostat and regulator to give four flame sizes. A limit control is also included as standard equipment.

108—Oil Burner

A new Type V, graduated flame, continuous heat, oil burner using No. 2 domestic fuel oil and having a maximum consumption of $2\frac{1}{4}$ gallons per hour on high flame and graduated to $1\frac{1}{2}$ gallon per hour on low flame, is announced by McIlvaine Burner Corporation, 663 West Washington Boulevard, Chicago, Illinois.

A number of new and improved features are claimed for the burner, such as gravity oil feed to float valve, patented spring loaded disc valve for the

109—New Portable Drills

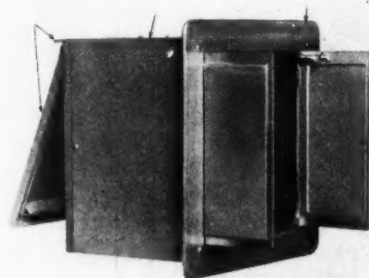
Skilsaw, Inc., manufacturers of the portable electric hand saw announce a new line of portable electric drills.

The manufacturers claim the following features: The motor is different. The drive and bearings show a distinct change in practice. Efficiency is markedly increased. Advance type switches are used. Bodies are of a new type. Split-hair precision in manufacturing has been achieved.

110—Kitchen Exhauster

A new kitchen exhaust type fan for application through the outside wall has been placed in production by the Midwest Ventilating Works, 123 East Pittsburgh Avenue, Milwaukee, Wisconsin.

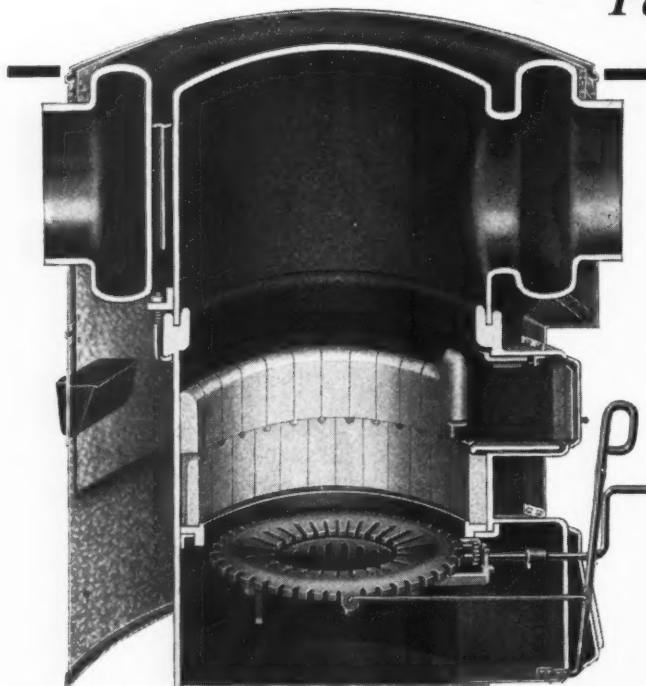
The feature of the new exhauster is an outside top-hung door and a double vertical-hung inside set of doors, which open when the fan is snapped on. All doors close automatically when the fan stops. These doors seal the unit from entrance of outside air and when closed present an attractive appearance on the



inside wall. If desired, the double set of doors may be replaced by a grille.

All parts of the fan which are exposed to the weather are made of dust-proof material. The fan wheel is 10 inches in diameter and operates on 110 volt, 60 cycle current with a total consumption of 50 watts per hour. The fan box is so designed that the unit may be attached to a short duct leading to a ceiling grille, if this arrangement is desired.

3 Great Features—Are Making This New Patented Furnace SELL



- IMPROVED COMBUSTION
- GREATER HEATING SURFACE
- FASTER AIR CIRCULATION

Yes! There is something NEW and IMPROVED in the heating field . . . the U. S. Welded Steel Furnace, incorporating such decided advancements in basic design that it provides a 50% faster circulation of warm air, yet requires less fuel!

The U. S. Steel Furnace has a STRAIGHT SIDED body, centrally located in casing, which greatly accelerates flow of air over hot surfaces . . . a double size steel radiator that completely surrounds combustion chamber at the top . . . a larger, improved combustion chamber . . . plus a dozen other great features.

Here is a furnace that does a better job of home heating . . . a furnace you can SELL . . . that will save money for home owners, and MAKE MONEY for you. Write for the facts today.

U. S. PRESSED STEEL PRODUCTS COMPANY
KALAMAZOO, MICHIGAN

WRITE TODAY
for the U. S.
Dealer
Offer

News Items

National Warm Air Meeting

The next convention of the National Warm Air Heating and Air Conditioning Association is to be held in Pittsburgh, Pa., in the Hotel William Penn. The dates are December 4-5-6, 1934.

The first day will be occupied with the meetings of the Association's various Standing Committees such as Research Advisory Committee, Installation Codes Committee, Technical Educational Committee and others. The Association's Board of Directors will also meet on that day. The 5th and 6th will be fully occupied by Convention sessions.

Committees having the program and arrangements in charge promise one of the most interesting and informative dockets the Association has ever offered. The program will include a resume of the latest developments from the Association's Research work which is carried on in co-operation with the University of Illinois, pertinent and timely papers, and discussions relative to engineering and commercial problems. All manufacturers, heating contractors, heating engineers and those otherwise interested in the industry are invited.

Waterproofing Code Amendment

The National Recovery Administration is mailing Approved Code No. 140, Amendment No. 1, covering an amendment to the Code of Fair Competition for Waterproofing, Dampproofing, Caulking Compounds and Concrete Floor Treatments Manufacturing Industry, as approved August 28, 1934.

The purpose and effect of the amendment is to authorize the Code Authority to submit a budget and method of assessment upon which funds shall be contributed by members of the industry. Copies of the amendment may be obtained from NRA.

Dail Appointments

Dail Steel Products Co., Lansing, Mich., announce that they have just appointed Ellmann, Incorporated, of Washington, D. C., sales representatives for the territory of Virginia, eastern Maryland, and Washington, D. C.

Also Charles H. Brown, as representative of Cincinnati, Ohio.

O. H. Wolff, of St. Louis, Missouri, covering the trade area of St. Louis, Missouri.

These representatives will have information on a complete line of Dailaire Heating and Air Conditioning Equipment.

Century's Business Increases

Showing a phenomenal spurt in sales, Century Engineering Corporation, Cedar Rapids, Iowa, manufacturers of oil burners, boiler-burner units, and humidifiers report an actual increase in shipments during the month of September of 83½% over the corresponding month of 1933. Early reports indicate the upward trend will continue throughout the next two months.

FHA Advertising Helps

We have received from headquarters of Federal Housing Administration a limited number of large advertising proof sheets showing specimens of sample advertising pages run in newspapers in different parts of the country.

The advertisements range from one inch classified to full page newspaper display advertisements. Buyers of space include individual contractors, banks, loaning agencies, corporations with loaning bureaus, manufacturers, building material supply houses, department stores and others.

Every practical type of advertisement is shown in these proof sheets. While our supply is limited we shall be glad to send to any reader a proof of a page containing any particular type of advertisement the reader is interested in. If you plan to advertise your service in conjunction with your own local effort or the cooperative effort of your community you can see what others are doing from these sheets. First come, first served.

VICTOR HEAT BOOSTERS

THIS
BEAUTIFUL
DISPLAY
FREE

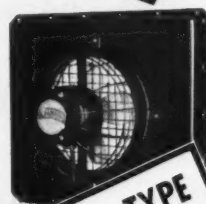


**Here's \$10.76
QUICK PROFIT**

A money-making deal you can't afford to miss!



FLOOR TYPE
LIST PRICE \$5.95



WALL TYPE
LIST PRICE \$7.50

RIGHT in your own neighborhood are hundreds of furnace-heated homes that need the Victor Heat Booster. With hardly any effort, you can increase your profits substantially by simply putting a Victor Booster display in your window and telling a few of your good customers about this amazing invention. Think of the people you know who are wasting tons of fuel trying to make a sluggish heating system produce sufficient heat and you'll realize what a tremendous business you can do on Victor Boosters.

YOU CAN GUARANTEE RESULTS!

When you recommend Victor Heat Boosters to your customers, you can do so with absolute confidence. In fact, you can guarantee perfect satisfaction even under extremely difficult conditions. This is your opportunity to cash in on an entirely new source of profits—don't lose a minute's time—mail the coupon below for your free display and a stock of four Victor Heat Boosters. There's \$10.76 quick profit in this attractive deal—mail the coupon right now!

VICTOR ELECTRIC PRODUCTS, Inc.
718 Reading Road, Cincinnati, Ohio

Gentlemen: Ship us your complete deal of four Victor Heat Boosters (two wall type and two floor type) and your free window display.

Name

Address

Name of Jobber

NOTE: Dealer discount on four or more Victor Heat Boosters is 40% from list. Direct Purchases accepted on C. O. D. basis.

MAIL THIS COUPON TODAY!



A Profit-Builder for 28 Years!

It is no mere happenstance that Armco INGOT IRON has been helping contractors *make money* and preserve customer good-will all these 28 years. • Originally, this highly-refined iron was made especially to resist rust. It is a better iron, if anything, today. • Your customers and *prospective customers* know Armco INGOT IRON, believe in it. For 20 of these 28 years, they have read about it in their favorite national magazines. For 5 years they have been entertained by Armco over radio, have heard more reasons why "INGOT IRON" is the *safest* galvanized metal to use. • The resale value of Armco INGOT IRON is high, and thousands of contractors like you know it through years of experience. It fights rust; it works easily and surely, cuts time and labor costs—waste. • Before you restock, see an Armco Distributor's salesman. He will explain Armco's Shop Selling Aid Plan to increase your profits!

**TELL YOUR CUSTOMERS! Armco Over N. B. C.
Sunday Nights: 6:30 E. S. T.**

THE AMERICAN ROLLING MILL COMPANY

Executive Offices:

Middletown, Ohio



**THE SHOP-SAVING IRON
THAT SELLS EASIER**

News Items

Elgin Labor Day Float

Through the courtesy of H. W. Green, secretary of the Elgin Sheet Metal Workers local, we have received the photograph showing the float used in the Elgin Labor Day parade.

The star on the float is 8 feet high and the base under the star is 3½ feet by 7½ feet by 2 feet high. There are



160 raised letters on the signs and base. The fabrication of the float was made possible by donations from salesmen and owners of the shops whose names appear on the signs. All the labor for the float was contributed by members of the association local.

The float was one of the most popular in the parade.

Air Conditioning Meeting

On October 5 under the auspices of the J. M. and L. A. Osborn Company more than 300 interested individuals attended an evening session devoted to a discussion of air conditioning. The meeting was held in offices of the Osborn company with A. W. Howe, president acting as chairman.

Many of the men attending came from distant points to hear the discussion. The speakers of the evening were Eugene P. Farris, field engineer and E. B. Langenberg, consulting engineer of the Emerson Electric Company, St. Louis. The subject was air conditioning and its relationship to the sheet metal contractor.

The session lasted for more than three hours and at the end the meeting expressed a desire for another discussion of the same kind.

New Revere Office

Revere Copper and Brass Incorporated announces the opening of a new office at 922-23 Grand Rapids National Bank Building, Grand Rapids, Michigan. David T. Applebee, Grand Rapids district manager, will be in charge of the office.

Death of Howard K. Moore

Howard K. Moore, 50, special agent for the Wheeling Steel Corporation of Wheeling, Vice-President of the Wheeling Steel Corporation of Texas and the Wheeling Steel Corporation of Tennessee, subsidiaries of the Wheeling Steel Corporation, died at his home in Wheeling, Thursday, September 20th, after a three-months' illness. Mr. Moore had been identified with the Wheeling Steel Corporation and predecessor companies in responsible positions since 1910.

Mr. Moore was born at Coatesville, Pa., June 27, 1884. He was a member of the Blue Lodge and Scottish Rite Temple of Cincinnati; Osiris Temple of Wheeling and Scottish Rite at Wheeling, and was a member of the Vance Memorial Presbyterian Church.

Surviving are his wife, Sallie M. Moore and two sons, George William Moore of Portsmouth and Howard Nelson Moore of Washington, D. C.

Fabrication of All Metal Air Craft

(Continued from page 17)

panied by a finished master hardwood pattern, used in finishing the punches and dies to size.

Punches and dies are produced, in addition, for the company's hydraulic presses on which larger and thinner gauge metal parts are formed. Usually, these are of eastern maple, although steel, brass and fibre inlays are used when it is determined that wood alone would be insufficient to meet the pressure required. One of the presses, incidentally, has a pressure of 700 tons.

Hardwood is the material chiefly used in producing jigs, dies and templates. For the more important layouts requiring extreme accuracy, however, one-sixteenth inch hard duralumin is employed. Commercial plywood

is used for contour boards and layouts requiring shaping and beveling.

Metal Treating

Heat treating is used, both for duralumin and steel, as a means of increasing tensile strength of the metal.

Large unformed duralumin parts in sheets and smaller parts made of soft material which already has been formed are immersed in tanks containing a molten salt solution for from twelve to twenty-two minutes, according to the metal's thickness. The tank temperature is maintained at 950 degrees Fahrenheit.

On being removed from the tanks, parts are dashed in cold

water, then are transferred to a hot water tank where all salt remaining on the metal is dissolved.

Duralumin rivets are similarly treated. After the process, however, they are placed in dry ice containers as a means of retarding their aging until they can be driven. Carriers distribute the rivets from the ice containers to riveters about the shops. All rivets thus distributed and exposed to room temperature for fifteen minutes without having been used, then are collected and returned for re-heat treating.

By means of heat treating, the tensile strength of duralumin is more than doubled, being raised from its normal tensile strength of 26,000 pounds per square inch to approximately 55,000 pounds per square inch.

Faultless Heater Corporation

CLEVELAND, OHIO

Continues the manufacture of the former
Graff Furnace Company's

FAMOUS FAULTLESS FURNACES

and
FURNACE REPAIR PARTS
(from the original patterns)

**FAULTLESS
FAULTLESS-COMFORT
LACKAWANNA
RIVAL**

**COMFORT
CAPITAL
PHILADELPHIA**
and other Graff Furnaces

Among the Supply Houses carrying a stock of these Repair Parts made from our original patterns are the following:

NEW YORK CITY, N. Y.
Faultless Range & Mfg. Co.
WASHINGTON, D. C.
Fries, Beall & Sharp Co.
PHILADELPHIA, PA.
Aetna Stove Co., Inc.
Standard Stove Repair Co.
United Stove Repair Co.
Weinstein Supply Co.
M. Stein
Central Stove Repair & Fdy. Co.
NEWARK, N. J.
Eselgroth & Co.
ALLENTOWN, PA.
Pennsylvania Supply & Mfg. Co.
SCRANTON, PA.
Samuel Weinberg & Sons, Inc.
WEST PITTSBURGH, PA.
Thos. R. Davis Co.
MILWAUKEE, WIS.
The Speck Company
BUFFALO, N. Y.
O. G. & D. H. Donaldson Co.
Minnet Heating & Supply Co.
CHICAGO, ILL.
Associated Heater Parts Co.

YOUNGSTOWN, OHIO
Banner Repair Parts Co.
ROCHESTER, N. Y.
Henry Siebert Sons, Inc.
PITTSBURGH, PA.
The Graff Company
A. H. Johnson Co.
Shamblen Furnace Parts Co.
WILKES-BARRE, PA.
White Hardware Co.
Wilkes Barre Hdware. & Stove Co.
BALTIMORE, MD.
S. G. Kugler Co.
George J. Thaler, Inc.
BOSTON, MASS.
Huse & Carleton, Inc.
Henry N. Clark Co.
SHAMOKIN, PA.
Geo. B. Kelsner
NEW HAVEN, CONN.
New Haven Stove Repair Co.
NEW BRUNSWICK, N. J.
New Brunswick Stove Co.

These Supply Houses can give you prompt service.



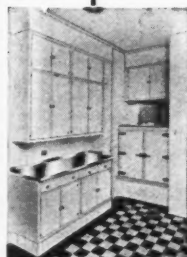
It will serve your customers as excellently as it serves
America's Leading Industrialist

APOLLO ChromCopper
Satin Finished

Stands the Gaff on

Drain boards
Table tops
Meat warmers
Shelf covering
Refrigerator
linings
Range hoods

Clothes chutes
Reflectors
Ice cream
cabinets



Write for sample and prices to

APOLLO COMPANY
Box AA
LA SALLE, ILLINOIS



Steel heat treating equipment at the Boeing plant includes three pot-type furnaces, gas heated, and three electric furnaces for larger parts. One pot-type furnace is used for quenching small parts, another for drawing, and the third, for cyanide hardening. The electric furnaces, in which temperatures run up to 1,800 degrees, are used for both quenching and drawing.

Chrome molybdenum steel such as is used for landing gear parts and spar chords of the airplane, is raised from a normal tensile strength of approximately 90,000 pounds per square inch to 180,000 pounds per square inch. Nickel steel, such as is used for terminals, bolts, etc., as well as for certain forgings, is raised from approximately 85,000 to 95,000 pounds per square inch to as high as 200,000 pounds per square inch.

Corrosion Plating

All duralumin and aluminum parts go through what is known as the anodic process and all steel parts, through the cadmium plating process, as a means of protecting them from corrosion.

In the case of the anodic process, parts are suspended in a chromic acid solution kept at a temperature of ninety-five degrees and agitated by means of air pressure. Direct current is applied and gradually increased in voltage. The result is an artificial oxidation, with corrosion started, then arrested, leaving a protective oxide film on the surface of the metal.

Cadmium is used in the electroplating process for steel for the reason that it is softer than chromium and because it does not break down under quick changes in temperature.

Problem Corner

(Continued from page 56)

to fall out of the air before it reaches the furnace excepting where it is scuffed up by persons or by wind through open windows.

Referring to the specific questions in the last part of your letter, there will be back draft when the basement door is open and this will upset the air flow through the return grilles. These systems are against the Standard Code. The Standard Code was written into the NRA Code of the National Sheet Metal Contractors' Association, which was signed this spring.

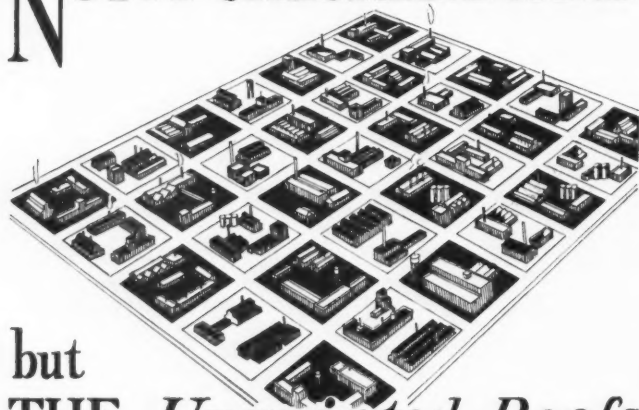
Fulton-Montgomery County

The Fulton-Montgomery County Association of New York State are laying plans and starting work on the project of gathering figures for an overhead survey. The association is also making plans for setting up a bid depository.

It is expected that preliminary work will be completed within a few weeks and an organization effected to make code compliance workable.

Fred Chatterton,
Secretary.

NOT A CHECKERBOARD



but THE *Unpainted Roofs* IN YOUR COMMUNITY

IN every community, there are any number of sheet metal roofs which must be painted at regular intervals in order that they adequately protect the buildings they cover. This is profitable business that sheet metal men frequently fail to take advantage of.

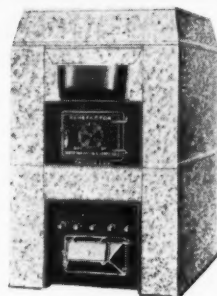
The way to most profitably work this business is with Thompson's "370 SPECIAL RED." This paint is outstanding because it has passed every quality test. Pure Red Lead, the best

rust preventative known for metal, genuine imported Spanish Sesqui-Oxide of iron, highest grade Raw and Boiled Linseed Oil, just enough drying oils to give the proper set up—all go to make up a paint for sheet metal roofs that never gives cause for come-back or complaint.

Other Thompson Products are Alumbrite, the new Aluminum Paint for Wood and Steel and Lin-o-Jap, the Perfect Reducing Oil for all Paint.

THOMPSON & COMPANY
P. O. Box 557, N. S. PITTSBURGH, PA.

HESS FURNACE AIR CONDITIONER BLOWER FILTER UNIT



HESS BENEFACITOR
welded steel furnace

MAKES MONEY
FOR ANY DEALER

Priced as low as the ordinary cast iron furnace.

Hess equipment gives the home owner greater heating efficiency, economy, cleanliness, comfort and advantages of air conditioning. Selling on the basis of performance and real value makes dealer profits and gives the Hess dealer a tremendous advantage.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE., Founded 1873
CHICAGO, ILLINOIS

News Items

FHA Poster

The official poster of the FHA shown herewith may be obtained by addressing Advertising Material Section, Federal Housing Administration, Washington, D. C.

Mats, stereotypes or electrotypes in sizes $\frac{3}{4}$, $\frac{7}{8}$, 1, $1\frac{1}{2}$, 2



and 3 inches may be obtained for use in advertising matter. These emblems will be mailed free of charge.

Contractors co-operating with the FHA movement are requested to show this emblem on all letterheads, literature and advertising.

Armco on the Air

Beginning Sunday, September 30th, at 6:30 P.M. Eastern Standard Time, the famous Armco Band and the familiar voice of the Armco Ironmaster were again heard over NBC's Red Network and Southwestern stations. Twenty-one stations broadcasted these Armco Ironmaster programs, each Sunday night.

This marks the beginning of Armco's sixth season on the air, during which time a tremendous audience has been built up. Directed by Frank Simon, internationally famous conductor, the Armco Band has been acclaimed one of the oldest and most outstanding musical organizations on the air today. Its forty-five professional musicians have played under the batons of some of the world's leading band and symphonic conductors.

The Armco Ironmaster will again present his talks on the part the iron and steel industry is playing in world progress. Bennett Chapple, who takes the part of the Ironmaster, is vice president and director of publicity for The American Rolling Mill Company. He is well-known in the advertising and merchandising world.

Armco will be joined this year by its subsidiary, The Sheffield Steel Corporation in sponsoring these programs. Sheffield will make special commercial announcements over the Southwestern Group, which covers the territory it serves. The Armco commercials will go out over the Red Network.

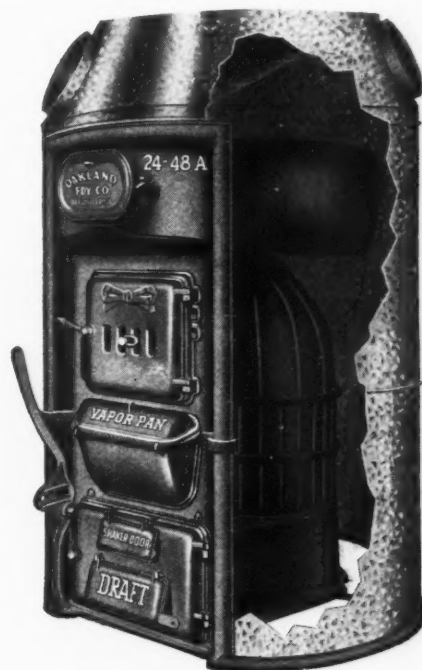
Official Labor Poster

The National Code Authority of the Roofing and Sheet Metal Contracting Division of the Construction Industry, 429 Fourth Avenue, Pittsburgh, Pa., announce that 50,000 copies of the Official Labor Poster for the Roofing and Sheet Metal Industries have been received and posters are being sent to all members of the industry who have applied for them.

Additional copies may be obtained by contractors wishing them or contractors who have not already received a copy should address the Code Authority Committee.

The Official Labor Poster is made of heavy paper on which is printed in full labor provisions for our division of the Construction Industry. As contractors realize, copies of the labor poster must be placed conspicuously in all offices, shops and on all construction jobs coming under the jurisdiction of our Code.

✓ The Points of



The Sturdy 1934 Oakland

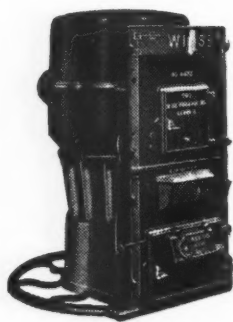
- 1—Heavy Straight Side Fire Pots.
- 2—Roller Bearing, Duplex Lever Shaker Handle Grates.
- 3—Large Grate Areas.
- 4—Large Heating Capacities.
- 5—Domes and Ash Pits Extend Through Fronts.
- 6—One-Piece Radiators.

Write for Descriptive
Literature and Prices

OAKLAND FOUNDRY CO.
Belleville III.

QUALITY FURNACES

at ordinary prices



No. 40 Series



No. 20 Series

Furnaces

Dealers can buy and resell Wise Furnaces with confidence. Each Furnace has quality built into it which results in more heat at less cost, and each has the two most important items in furnace construction—an air cell fire pot and a self-cleaning radiator.

Air Conditioning Units

Ask for literature on Fairweather Air Conditioning Units. A size and type for every requirement.



Write for Complete Information on the Wise Line and Take Advantage of Wise Construction Features and Wise Policies To Give You a Successful Heating Season.

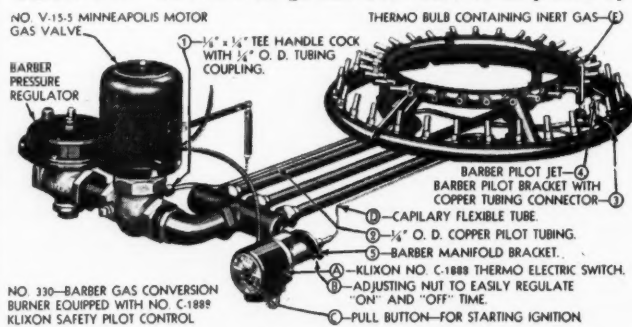
WISE
FURNACE COMPANY
AKRON, OHIO

News Items

Barber Gas Burners Receive A. G. A. Approval

Announcement is made by the Barber Gas Burner Company of Cleveland that Barber Burners have just been accorded full approval by American Gas Association Testing Laboratories, and are so listed in the October issue of Approved Appliances. This is the first occasion on which a conversion burner has received such recognition.

Harry Kerr, President of the Barber Gas Burner Company, also states that several improvements of interest to the trade and to gas companies have been made in the entire burner line. The size range has been further amplified by



NO. 330—BARBER GAS CONVERSION BURNER EQUIPPED WITH NO. C-1889 KLIXON SAFETY PILOT CONTROL

the addition of three new units for round warm air furnaces, steam and hot water boilers, which now insures a tailor-made Barber assembly for any grate diameter from 12 inches to 34 inches inclusive.

Refinements have also been made in the design of the famous Barber Jet and the entire assembly, which effect more quiet operation, without reducing the high flame temperature of 1900° Fahrenheit for standard gas consumption.

A. D. Walter Joins Peerless

The Peerless Electric Company, Warren, Ohio, announces that A. D. Walter has become associated with its organization, and will maintain his headquarters at the Warren office.

Mr. Walter helped organize The Ohio Electric & Manufacturing Company in Cleveland, and for more than



fifteen years has specialized in the design and construction of small motors. Mr. Walter's broad experience in the small motor field has included the application of special split phase and capacitor type motors for the Oil Burner Industry and Air Conditioning Systems.

One of the accomplishments in this connection was that of developing and producing in quantities the first satisfactory sleeve type motor to operate in a vertical position driving Rotary Oil Burners.

Ventilator Standardization

W. F. Hirschman, president and technical secretary of the Roof Ventilator Institute announces that the Institute has under consideration at the present time a proposed standardization of gauges of metal for the various types of roof ventilators. The Institute also is preparing a set of specifications of proposed gauges for roof ventilator bases and a standardization of designs and sizes of roof ventilator bases. The Institute is also preparing a standard method of testing exhaust capacities for all types of ventilators.

Further information on the activities of the Institute will be announced later.

News Items

Hollop Joins Hart & Crouse Co., Inc.

S. H. Allston, sales department of the Hart & Crouse Co., Inc., Utica, New York, announces that John L. Hollop, formerly with the Hunting Co., has joined the sales force of Hart & Crouse Co., Inc., and will cover central and western sections of New York State.

Replacement Sales Campaign

Believing that a large market will be available to dealers for the sale of controls and accessories to modernize heating plants due to F. H. A., Minneapolis-Honeywell Regulator Company have prepared and are now running a powerful national advertising campaign. It consists of full pages and smaller space in a group of the more important national magazines which reach millions of readers, and in fifteen large metropolitan newspapers. This advertising emphasizes the need for bringing installations up-to-date. It began in August and will continue through December. Its purpose is that of building business in which architects, engineers, heating dealers of all kinds, air conditioning dealers and contractors will share.

The company suggests that a good way to get at this market is through the offer of a free inspection which will in no wise obligate the user but which will give your salesmen an opportunity to make constructive suggestions, many of which will result in orders. Individual dealers who have carried on such campaigns have produced a considerable extra revenue which in addition to bringing the dealer very desirable profits will serve to keep at least his better sales and service men together during a season when it would otherwise be necessary to let them go, with a subsequent inconvenience and expense of rebuilding an organization for the next heating season.

Such a replacement sales campaign is especially timely this fall in view of the tremendous activity resulting from and built upon the Federal Housing Act. All over the country, in cities of every size, local committees are carrying forward aggressive advertising and promotion campaigns to stimulate interest in modernizing to save property from depreciation, to improve the appearance, to increase values and to provide work for the hundreds of thousands of people connected directly and indirectly with the building industry. All of this publicity will help you to make a replacement sales campaign of your own and produce a good volume of profitable sales.

The magazines Time, Collier's, Fortune, American Home and Country Life will be used.

Clifford Niehaus Recuperating

Clifford J. Niehaus, president of the Niehaus Furnace and Boiler Parts Co., Cincinnati, Ohio, is recuperating satisfactorily at his home in Cincinnati from a recent major operation.

N'WHA Annual Convention

The 40th Annual Convention of the National Wholesale Hardware Association will be held in the Marlborough-Blenheim Hotel, Atlantic City, New Jersey, Monday to Thursday, October 22 to 25 inclusive.

The convention will be held in conjunction with the meeting of the American Hardware Manufacturers' Association. The Code for the Wholesaling or Distributing Trade and the Supplemental Code for the Wholesale Hardware Trade will be covered in several sessions. The Code Authority for the industry is expected to be organized at the convention and necessary procedure established.

The National Association of Sheet Metal Distributors will meet Tuesday afternoon, Wednesday morning and Wednesday afternoon. The Code Authority for the Sheet Metal Distributing Trade will be present and all distributors will be given an opportunity to express their opinions concerning the activities and policies of the committee. Regional committees will be appointed at these sessions. Plans for securing the co-operation of manufacturers of asphalt and asbestos shingles and prepared roofing to the end that economical and satisfactory distribution by sheet metal distributors can be secured will be the subject of one session.

Arrangements for reduced railroad fares and hotel rates have been made by the committee in charge.

RACKETEERS OF WASTE



Waiting for your Sheet Metal Decision!

Don't overlook these three Racketeers of Waste when you make your sheet metal decision! Wear, Weather and Corrosion take a terrific toll from buildings everywhere. Don't buy sheet metal to feed their destructive appetites. Insist on GOHI, Pure Iron-Copper Alloy. Then you'll know you are getting the longest-lasting, wear, weather, corrosion and abuse resisting low cost ferrous metal ever produced.

You cannot afford to take chances on your sheet metal purchases. Be Safe! Use only GOHI.



Complete information and samples on request.

GOHI Pure Iron-Copper Alloy is available in all sizes and gauges. Produced exclusively by The Newport Rolling Mill Company, Newport, Kentucky.

GOHI

SHEET METAL

Pronounced
"GO-HIGH"

B A L A N C E D

FROM one-piece, quickly levelled base to light, strong one-piece radiator, the Niagara Warm Air Furnace is a model of balanced design. Perfect distribution of weight makes a furnace live longer and work better. Add this feature to Niagara's well known speed of assembly, permanently tight construction, years-ahead appearance and exclusive selling features, and you begin to understand Niagara dealer preference. Such qualities are not attained over night. They illustrate the sound experience of "heating engineers since 1893".

Window Signs Free!

Furnace dealers are urged to cooperate with the Better Housing Program of the Federal Housing Administration. Write us for the government's literature and any information. We shall be glad, also, to furnish attractive window signs inviting the public to get the details from you.

Original Repair Parts

We stock and ship promptly genuine original repair parts for the following furnaces: *Queen, Scheible, Sixth City, Sanitary, Peerless, Monarch, Niagara.*

THE FOREST CITY FOUNDRIES COMPANY
2504 West 27th Street Cleveland, Ohio

NIAGARA

WARM AIR FURNACES

New Literature

For your convenience a number has been assigned each item in this column. A coupon will be found on page 71. Check the items you want and mail to us. We will forward the information you check.

201—The New Day

"The New Day for Furnace Heated Homes" is the title of a small leaflet for consumer reading recently introduced by Russell Electric Company, 342 West Huron Street, Chicago, Illinois.

The leaflet explains the four unit groups of equipment, such as unit No. 1, automatic control for gravity furnaces; unit No. 2, the automatic humidifying system; unit No. 3, Hold-Heat winter air conditioning fan and filter unit; unit No. 4, the night ventilation fan unit.

Each of the four unit groups of equipment are shown by drawings and photographs and the operation and construction of the equipment explained. For consumer information the advantages of automatic control, humidification, night ventilation and other features are explained in the text and by suitable drawings.

202—Conditioned Air

"Conditioned Air" is the title of a new three-color leaflet announced by Perfection Stove Company, Cleveland, Ohio. The leaflet shows by drawings, photographs and text the new Model 140-E, 120-E and 160-E oil burning, air conditioning furnaces. Complete information on the construction of each unit with capacities, dimensions, etc., is included. Photographs of suggested and actual installations indicating basement improvement made possible by these modern heating appliances are also shown. Sketches show typical installation details and cut-away views indicate the features of the apparatus.

The leaflet is designed for consumer reading and explains in plain language the benefits to be derived from automatic heat of the forced air, filtered type.

203—Fan Leaflet

The Forc-Air Company, Rockford, Illinois, has prepared a small leaflet showing the company's conditioning unit.

This unit consists of a housing containing five filter sections, a twin fan unit of the propeller type and the necessary transitions for connecting the housing to the return air pipes and the furnace casing. The leaflet shows all dimensions of the apparatus and includes price specifications. Information on the proper methods of installation are contained in the leaflet.

204—Engineering Manual

An unusually complete manual of engineering data on heating and ventilating has been prepared by Cary Manufacturing Company, Waupaca, Wisconsin. The manual covers a wide variety of pertinent information such as air velocity, infiltration, air change, filters, humidification, combustion tables for oil furnaces, data on duct calculations, heat losses and insulation together with numerous tables for such commonly used information as conversion areas, degree-days, circular equivalents, friction charts, heat transmission coefficients, pipe sizes and numerous formulas for such factors as specific heat, volume and pressure loss, etc.

The material is arranged in such order that all information pertaining to equipment and design and the engineering data can be found in sequence. Various parts of the manual are illustrated by detail sketches and the solution of typical problems.

205—Rust Leaflet

Republic Steel Corporation has prepared a small leaflet entitled "Thumbs Down on Rust." The leaflet presents some of the effects of rust and by illustration and caption shows numerous applications of rust resisting Republic Steel Corporation metals.

New Literature

For your convenience a number has been assigned each item in this column. A coupon will be found on page 71. Check the items you want and mail to us. We will forward the information you check.

206—Ventilating Catalog

A comprehensive catalog and manual of useful information covering gravity ventilation has been prepared by The Allen Corporation, Detroit, Michigan.

The booklet is profusely illustrated with drawings, photographs and detail sketches showing the manufacture of the Allen turbine ventilators, typical installations and complete information on the apparatus.

Other chapters in the book give information required to select the proper size and number of ventilators for different types of installations. Numerous typical problems of application, such as apartment buildings, ships, factories and residences are presented.

The new Allen exhaust fan is covered with complete characteristic tables. The last part of the booklet contains technical data covering displacement capacities, recommended air changes, wind velocities, wind pressures, weights and measures, areas and circumference of circles, etc.

207—Insulation Leaflets

General Insulating & Manufacturing Company, Alexandria, Indiana, has a series of leaflets dealing with insulation covering the application of the material to residences, commercial and industrial buildings of all types.

One leaflet covers the application of "Sealal", a rock wool bat for use in ceiling and wall studding spaces.

A second leaflet gives complete information on the physical characteristics of Sealal and shows in drawings and tables the reduction in heat loss brought about by the application of this material.

A third booklet gives the history of rock wool.

A fourth booklet is a pictorial presentation of the advantages of insulation.

208—Cleaner Catalog

A new leaflet on furnace cleaning giving full information on the Sturtevant Vortex furnace cleaner and attachments and containing interesting information on the possibilities of profit derived from cleaning furnaces and boilers has been prepared by B. F. Sturtevant Company, Hyde Park, Boston, Mass.

209—Belt Drive Leaflet

A four-page leaflet covering V-belt drives for all types of fractional horsepower motors and small machinery has been prepared by the Dayton Rubber Manufacturing Company, Dayton, Ohio.

The leaflet gives the construction features of this belt and detail tables contain the necessary information for choosing the right belt for the particular type of motor and equipment moved. Tables, prices and pulley wheel sizes, etc., are also presented.

210—Tool Catalog

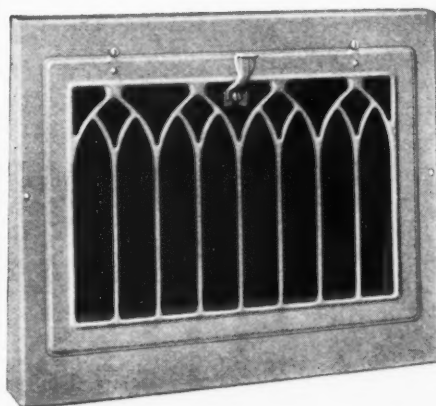
The "Universal Shear" is presented in a leaflet just issued by the Quickwork Company, St. Mary's, Ohio.

The leaflet shows various types of work which this machine is designed to do and gives complete tabulations of sizes, capacities and dimensions of the various machines manufactured.

211—Inland Steel Zinc-Alloy Leaflet

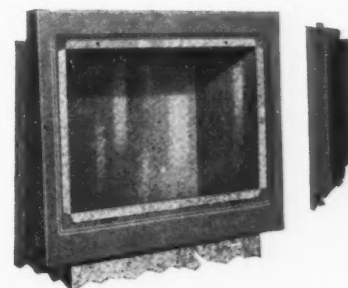
A new leaflet describing Inland Zinc-Alloy sheets, a special sheet described as a zinc-coated steel sheet with the zinc and steel alloyed and permanently fused together and the zinc actually penetrating the steel, will be mailed to contractors by Inland Steel Company, 38 South Dearborn Street, Chicago, Illinois.

Two H & C Items You Should Know About



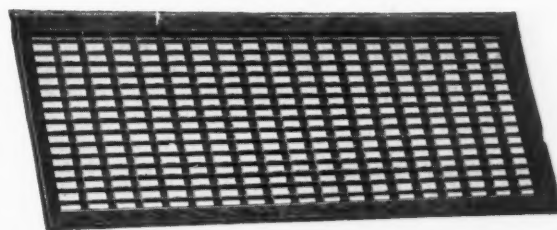
No. 120. BASEBOARD REGISTER

*The
Stackhead
Overlaps
the Frame*



For those sections where installers prefer baseboard registers with stackhead overlapping the frame, we offer the No. 120 series, furnished in the same face design as the extremely popular No. 110 series. New valve mechanism is guaranteed to give satisfaction. Possibility of streaking is reduced to a minimum.

In the No. 265 Cold Air Race shown below, installers who prefer the "grid" type face will discover many structural superiorities that unmistakably stamp it the finest product in its class. See your jobber about these new items or write for catalog.



No. 265. "NO-FLEX" COLD AIR FACE

HART & COOLEY MFG. CO.

CAST AND
STEEL



WARM AIR
REGISTERS

GENERAL SALES OFFICE 61 W. KINZIE STREET, CHICAGO

Have You an
"ORDINARY" FURNACE JOB

Where Prices and Good
 Installation Count?

And Have You an
ELABORATE FORCED AIR JOB

Where the Most Important Thing
 Is That Everything Shall Be Right?

HANDY PIPE

is America's BEST furnace pipe for every
 warm air furnace job and our catalogues
 will

**HELP YOU FIGURE
 YOUR ESTIMATES**

*Free on request—if you do not have
 copies already.*

F. MEYER & BRO. CO.
 PEORIA ILLINOIS

New Literature

For your convenience a number has been assigned each item in this column. A coupon will be found on page 71. Check the items you want and mail to us. We will forward the information you check.

212—General Electric Booklets

Two new booklets covering the subject of air conditioning "How to have a home that will stay modern" and "It's in the air" have been published by General Electric Company, Air Conditioning Department, New York City.

Both booklets are designed for the buyer of air conditioning apparatus. The first booklet treats air conditioning from the standpoint of making air conditioning insure future up-to-dateness. Photographs of conditions in homes not air conditioned and interesting views of the General Electric air conditioned house with its apparatus and the things which the company have discovered are shown throughout.

The second booklet covers what air conditioning means to the buyer. Profits are covered in detail and all the apparatus used in residential and commercial air conditioning work are shown. Typical home and office installations with drawings showing recommended locations of apparatus are also included. The general subjects of four o'clock fatigue, smoky air and over-humidification are covered by pictures and text.

213—Shielded Arc Booklet

The Lincoln Electric Company, Cleveland, Ohio, will mail to interested contractors a new booklet "The Shielded Arc."

This booklet deals with the advantages of the shielded arc process, gives detailed information on metal structure obtained by various methods of welding, covers typical properties of various types of welds and illustrates typical tensile strength tests.

Many interesting illustrations of testing abuses applied to typical welded sections are shown by illustrations and explained in detail.

214—Welding Booklet

The publication of a new 8-page illustrated booklet entitled, "101 Uses for the Air Acetylene Flame," has just been announced by The Linde Air Products Company, 30 East 42nd Street, New York, N. Y.

The text points out that the air-acetylene flame does not take the place of the widely-used oxy-acetylene flame, but serves as a supplementary tool for use where lower flame temperatures are required.

The booklet goes on to describe the outfit necessary for the work and discusses the advantages of the process. It then proceeds to take up in succession a number of different fields where the process is extremely useful. These include Plumbing and Piping, Air Conditioning and Refrigeration, Marine Work, Automotive Repair, Power and Electrical, and others.

215—"Homes for Modern Living"

The Stran-Steel Corporation, 6100 McGraw Avenue, Detroit, Michigan, have prepared an elaborate booklet entitled "Homes for Modern Living," describing the company's houses at Chicago's Century of Progress.

This booklet is illustrated with elaborate photographs, plans and interior views of the houses. Complete information on the construction and equipment used in the houses is contained in the pages.

What Burns Out Grates

(Continued from page 18)

grate to keep the bars cool. They forget the more air that goes through the grate the hotter the fire and more slag.

"To keep grates cool all the air you can get will not help the grates unless some unburned coals or ashes are on the grate to catch the slag as it comes down. Ashes fuse same as iron, in drops, the ash near the grate comes down as dust.

How to Test

"Try this: Shake your grate until the hot coals rest on the grate. Keep ash door open and put a sheet of iron in ashpit and see the shooting stars. This is slag also some dust comes down. Hunt up an old burned grate and notice the slag on the bars. Slag that closes the openings does not burn the bars. This is simply welded to the iron. That

which drops through and hits the iron, then drops through, if in large enough stream melts out the grates.

Clinker Fallacy

"You hear men say clinkers burn out grates, just the opposite, clinkers save the grate. If the ash or unburned coals had not been there and acted as a dam this hot stuff would have gone through the grate. Using a poker you simply put hot coals on the grates and as the fire is hot all the way down and the melting ashes all go this way.

"There is only one answer to melted grates and that is hot slag, and if ashes are up against the grates, how can you make a melting heat with no draft. Every flat grate that I have looked at was burned in the center or back and covered with slag, that goes to show what I claim they put the hot coal on the grate bars.

"If any information is wanted or contractors want to discuss this further, write me."

Problem Corner

(Continued from page 40)

The question in regard to storing up refrigeration brings out the fact that there is an error in setting the type on page 41. The calculation, on pages 40 and 41, referred in several places to 35° F. water to be used in the cooling coils. The last calculation is also in error. The amount of air in circulation should be based on the *sensible* heat, which was found to be 17,059 B.t.u. per hour. With a value of 0.2467 for cp of the air, and a temperature rise of 20° F., the weight of air to be circulated per minute is

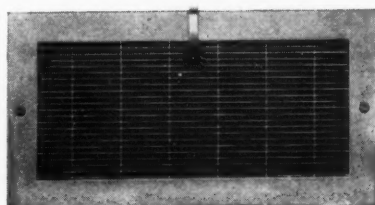
$$\frac{17,059}{60 \times 0.2467 \times 20} = 57.6 \text{ lb.}$$

FHA Drive

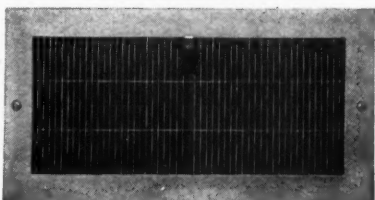
Newspaper notices from Cleveland state that a campaign to raise \$40,000 to be used to conduct a Better Housing Drive has been opened in Cleveland.

The drive will be intensively conducted for four weeks under the jurisdiction of an executive committee. The purpose of the drive is to acquaint the public with the provisions of FHA and to urge them to take advantage of the opportunity to repair, modernize and improve all types of structures.

Fine Mesh INDEPENDENT "Fabrikated" Forced Air Registers and Grilles

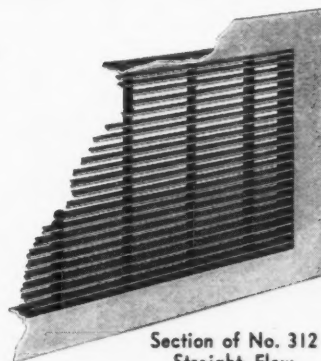


No. 312
Deflected 22½ degrees



No. 322
Deflected Fanwise
22½ Degrees

Nos. 312 and 322 with Fixed Straight or Directional Flow



Section of No. 312
Straight Flow

This fine mesh "Fabrikated" register has found much favor among architects and heating engineers because of its attractive appearance. Same high efficiency as all "Fabrikated" registers. Openings, $\frac{3}{8}$ " x $\frac{13}{4}$ "; bars of 20 gauge steel (.0375"). Made in grilles—without valves; and in registers—with single or multiple valves. In straight flow; or deflected sidewise or up or down, or fanwise 22½ or 45 degrees.

Send for descriptive
literature and prices

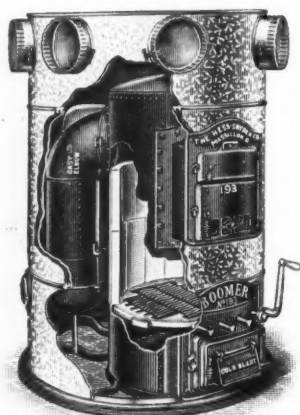
Manufactured by

INDEPENDENT REGISTER & MFG. CO.

3741 E. 93rd St.

Cleveland, Ohio

ANY
SIZE
•
ANY
FINISH



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 22 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 22 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.

Massillon, Ohio

AMERICAN STEEL SHEETS

FOR ALL KNOWN USES

In Industry and Construction

Use sheets of recognized reputation and value. For roofing, siding, gutters, spouting, air conditioning systems, and general sheet metal work — Keystone Copper Steel gives maximum rust resistance.

Insist upon AMERICAN Black Sheets, Keystone Rust Resisting Copper Steel Sheets, Apollo Best Bloom Galvanized Sheets, Galvanized Sheets, Heavy-Coated Galvanized Sheets, Formed Roofing and Siding Products, Tin Plates, Terne Plates, Black Plate, Etc.

Write us relative to your sheet steel requirements. This Company also manufactures U S S STAINLESS and Heat Resisting Steel Sheets and Light Plates for all purposes.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

SUBSIDIARY of UNITED STATES STEEL CORPORATION

New Literature . . .

For your convenience a number has been assigned each item in this column. A coupon will be found on page 71. Check the items you want and mail to us. We will forward the information you check.

216—Bryant Summer Air Conditioning

The Bryant Heater Company, 17825 St. Clair Avenue, Cleveland, Ohio, has published an interesting and instructive booklet—"Summer Air-Conditioning." The booklet describes the Bryant system of summer air conditioning for comfort, using silica gel as the dehydrating agent. Preliminary information on the need for cooling and dehumidification is presented. The principle of operation in this system is explained fully for the benefit of contractors not familiar with the apparatus. Descriptions of the dehydration unit and its practical application in residential systems is covered on several pages. Specifications of power costs, fuel consumption and ratings are contained for comparison. Diagrammatic sketches show the arrangement of apparatus, such as furnaces, coolers, fans, silica gel units in typical systems and the movements of air, water, gas, etc., through the units are shown by arrow lines.

217—Free Parts Cabinet Circulars

The W. C. Heller & Company, Montpelier, Ohio are offering without expense a comprehensive folder illustrating and describing many sizes and styles of cabinets designed especially for systematizing the handling of small parts and supplies which will reduce expense and increase efficiency.

218—Milcor Price List

The new Milcor 1934 Price Books are now in the hands of thousands of dealers, jobbers and salesmen throughout the country. Between their colorful covers are 128 pages of the latest price information selling data and illustrations of the Milcor line of sheet metal building materials and accessories. The price book has been completely revised and shows many new products and innovations in the sheet metal building line. A new indexing system simplifies the location of certain products and groups various materials according to type. The Standard Roofing Table and Standard Bundling Table on Sheets are included in the book.

A number of new products appear in this year's edition—two new styles of return air shoes, Selflock Stove pipe with a 3-point contact lock, corrugated adjustable stove pipe cylinders, three styles of airtight wood burning heaters and stove pipe drum ovens.

Among other additional items presented to the trade in this book are: galvanized rain proofs and chimney caps, 5-V crimp roofing, city or village mail boxes, single panel American metal tile, Milcor special ventilator, bull nose corner beads, burial vault mesh, Milcor's new plaster base.

219—Furnace Control Leaflet

The Thomas Long Controls Co., Inc., South Bend, Indiana, manufacturers of the Long furnace control, have prepared a leaflet showing by illustration and describing by text the application, advantages and operation of the company's heat control.

A suitable drawing shows the construction of the unit and explains its method of operation. This unit is a mechanical device, operating drafts and check on the principle of difference in expansion of metals.

For the home owner ten good reasons why the control is advantageous are explained in the leaflet. The booklet is designed for mailing to home owners by contractors. Information on securing quantities of the leaflets may be obtained from the company. The company has also prepared a revised price list for their equipment.

New Literature

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220—Copper Patina Leaflet

Announcement is made that from tests covering a period of more than six years, the Copper & Brass Research Association of New York has published a monograph on "Coloring Copper, Brass and Bronze." It has been reviewed and its presentation approved by the American Institute of Architecture. The monograph is of standard size for architectural filing and has as its numeral 15-B. Copies are being distributed by the Association to architects, sheet metal contractors and others interested in the coloring of copper and its alloys.

A Foreword says:

"Special attention is called to the presentation in this monograph of a newly developed process for obtaining artificially the greatly admired natural patina on copper. Many formulae have been proposed and recommended in the past for producing the patina rapidly by a simple chemical treatment. None of these, however, was entirely satisfactory as the color obtained was not sufficiently permanent. At the urgent suggestion of architects, the Copper & Brass Research Association in 1928 undertook a systematic and fundamental investigation of the nature of the patina and methods of reproducing it. The data on the two following pages are the results of this thorough study."

In addition the monograph contains formulae for obtaining various color effects on copper and copper alloys, including brown, reddish brown and blue black tones. It also contains information on pickling solutions.

Write for a copy if you wish one.

AMERICAN ARTISAN

6 North Michigan Ave.,
Chicago, Ill.

Send me more information about the products mentioned in your New Products section. Also see that I get a copy of the following literature mentioned in your New Literature section. I have checked the reference numbers of the items I am interested in.

New Products	
101.....	205.....
102.....	206.....
103.....	207.....
104.....	208.....
105.....	209.....
106.....	210.....
107.....	211.....
108.....	212.....
109.....	213.....
110.....	214.....
	215.....
New Literature	
201.....	216.....
202.....	217.....
203.....	218.....
204.....	219.....
	220.....

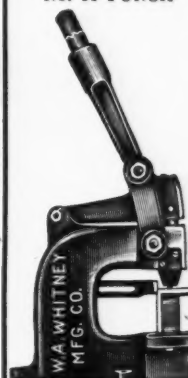
WHITNEY LEVER PUNCHES

No. 4B PUNCH



Length—8½ inches. Capacity ¼-inch hole through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—A" to A" by 64ths.

No. 91 PUNCH



Capacity — ¼-inch hole through ¼-inch, 1-inch hole through A-inch and 2-inch hole through ½-inch iron. Depth throat 5-inches. Weight — 82 lbs.

No. 1 PUNCH



Length — 34 inches. Capacity — ¼-inch hole through ¼-inch iron. Punches and dies in sizes from ¼ to A by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ¼-inch hole through ¼-inch iron. Punches and dies in sizes A-inch to ½-inch by 64ths.

CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

No. 6 PUNCH



Length — 26½ inches. Capacity — ¼-inch hole through A-inch iron; especially adapted for button punching or templet work. Punches and dies ¼" to A" by 32nds.

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Steel or Cast furnace repairs made by Peerless are guaranteed to fit—our experience building furnaces will help you with your repair problems.

Send your next order to
Peerless Foundry Co.
Indianapolis, Indiana, U.S.A.

Facts to Know About F. H. A.

(Continued from page 15)

Owners of improved real property include, in addition to owners in fee, persons holding an equity under mortgage, trust, or contract, persons holding a leasehold under a renewable lease for 99 years or more and persons holding a leasehold for a lesser term, provided such lease has more than fifty years to run. Except in unusual cases agreeable to the financial institution, notes should be signed by both husband and wife, unless forbidden by state law.

Notes may be signed by lessees, other than those which may be classed as owners, provided that the lease requires the lessee to make alterations, repairs and improvements and provided, further, that the final termination date of the lease is at least six months beyond the final maturity date of the note. In such cases, a certified copy of the lease must be furnished to the financial institution at the time the note is purchased and must be retained by it as part of its documentary evidence of the transaction.

2. Notes must not involve an obligation, the face amount of which is of

less than \$100 nor more than \$2,000, even though the repair or remodeling job may cost in excess of the latter amount.

3. The financial institution may not collect as interest and/or discount and/or fee of any kind, a total charge in excess of an amount equivalent to \$5 discount per year per \$100 original face amount of note.

4. Notes may provide for the payment by the maker of a "late charge" not to exceed five cents per dollar of each installment payment more than 15 days in arrears, to cover the extra expense involved in following up and handling delinquent payments.

5. Notes may not have a final maturity in excess of 3 years. A financial institution desiring to make loans or purchase notes with a final maturity exceeding 3 years, but not more than 5 years, may apply to the Federal Housing Administration for permission.

6. Notes must be payable in equal monthly installments except the final installment which may be slightly less. However, if the income of the maker

is received in the form of proceeds from the sale of agricultural crops or livestock, notes may be made payable in installments corresponding to income dates shown on the Property Owner's Credit Statement. Even in such cases at least one payment must be made yearly, however, and the proportion of total principal to be paid in later years must not exceed the proportion of total principal payable in earlier years.

7. The note must have been made to cover payments for alterations, repairs, or improvements upon real property belonging to the maker. An alteration, repair, or improvement job may include the cost of necessary architectural or engineering service, if used.

8. The note must not have been made to cover payments for movable equipment not considered a part of the real estate when installed.

9. The property to be improved must not have outstanding against it delinquent taxes or assessments. Such property must not have outstanding against it a mortgage or other lien not in good standing unless the holder of such encumbrance endorses the maker's obligation with recourse. Property having outstanding against it a demand mortgage such as used in

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Brass, Bronze, Copper, Steel, Stainless Steel, Aluminum, Monel, Zinc, Tin Plate, Lead, or any other sheet material perforated to your order. Perforations in rounds, oblongs, squares and special shapes. Complete stock of brass and tin in small sizes.

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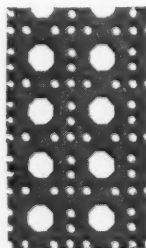
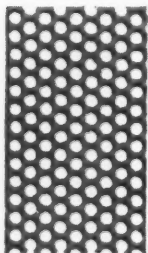
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POTS**

GRATES

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STOVE REPAIR CO.**

662 W. ROOSEVELT ROAD - - CHICAGO, ILL.

some states, will be considered in good standing if the property owner is making the regular interest (and principal, if required) payments on it which he has been making either for the past three years, or since the execution of the mortgage.

10. The maker (or husband and wife, jointly, if both are signers) must have a stated bona fide source of annual income at the time of the application, at least equal to five times the annual payments which the maker must pay on the note (or notes, if the same maker appears on more than one such note).

11. Any number of separate notes may be made for improving a single piece of property, but the aggregate principal amount of such obligations may not exceed \$2,000. Any notes in excess of this amount will not qualify for insurance, but if the notes are made or sold to more than one financial institution, each financial institution shall be entitled to rely on the Property Owner's Credit Statement as to the amount of prior notes.

No property owner may obtain credits to improve more than five separate pieces of property (not exceeding \$2,000 principal amount of obligation

on each property), without the prior approval of the Federal Housing Administration.

Credit under this plan will be based on the personal character and earning power of the property owner. No collateral, comakers or other endorsers are required in order to have the notes qualify for insurance.

It is vital that the property owner should not assume an obligation that is too large or which extends over too long a period. The note should be liquidated within the life of the improvements for which the credit is obtained. It is not the purpose of the National Housing Act to encourage unwise expenditure of money by property owners in improving property actually beyond the possibility of effective rehabilitation.

Prepayment of Notes

Financial institutions shall permit payment of notes in full any time prior to maturity date. In such case, a reasonable rebate of unearned charges, if any, collected in advance shall be made.

If a borrower desires to make one or more installment payments prior to due date, the practice should be encouraged, provided such prepayment is

in even multiples of the stipulated monthly installments.

Collection

If any monthly (or other) payment becomes past due, it will be followed up immediately.

If payment continues in arrears, the maker of the note should be interviewed. If, since the note was executed, the maker's income has been adversely affected or other emergency has arisen, either an extension for an agreed period (usually not more than thirty days) of all or part of the payment in arrears should be definitely agreed upon; or if it seems necessary, a new note should be arranged to pay the old note, extending the maturity and reducing the size of the regular payments required—this arrangement to depend upon exactly what payments the maker can make without difficulty. In such case the new note will be eligible for insurance. If the borrower fails to arrange an adjustment, prompt action should be taken, including legal process to enforce the terms of the obligation. A reasonable attorney's fee, not to exceed 15 per cent of the defaulted amounts collected, may be included in the claim,

ACCURACY AND SPEED



The old proverb says that poor workmen quarrel with their tools.

But even the youngest apprentice doesn't quarrel with Viking Shears. It is a tradition of sheet metal-working shops that the Viking works with accuracy and speed.

Let the precision of their workmanship and the rugged endurance keep your shop shear-happy.

Send today for details about the Viking—they'll be sent you promptly and without obligation.

VIKING SHEAR CO., Erie, Pa.

V I K I N G

LIBERTY Makes A Complete Line

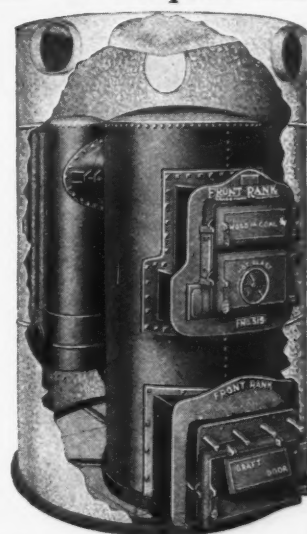
A famous merchant said "Don't try to change your customers' minds—give them what they want."

Furnace dealers who carry Liberty's line of furnaces have both steel and cast iron. You cannot only give them what they want but what they need.

Sell them a Front Rank steel furnace—no better furnace of its kind is made. Or, sell them the Mellow, leader of cast iron furnaces.

With this full line, you will make more profit and build business more soundly. Write for dealer proposition today.

LIBERTY FOUNDRY CO.
ST. LOUIS, MISSOURI



FRONT RANK
TRADE NAME REGISTERED

Longer fire travel and larger radiating surface are dominant features of this exceptional furnace. Built of copper-bearing steel, all joints of the FRONT RANK are riveted, caulked and welded, eliminating any chance of gas leakage. Grate is mounted on roller bearings, shaker level is waist high permitting ease of handling.

Let's Go — With F. H. A.

(Continued from page 13)

loans the whole program falls flat from inactivity.

Intensive pressure on loaning agencies will be required in these communities. Bankers must be interested in the proposition and made to see that they must do their part. Such pressure must be exerted by all the hundreds of contractors in all lines of work in the community.

We should realize early that while the maximum of \$2,000 will do a lot of repairing on most houses, we are not the only trade asking for a hearing. Owners will need and want dozens of other improvements just as much as they will want the services we render—SO—who gets the business rests with the contractor.

Campaigns which have been under way for some time show

that much education is needed for the average home owner. While he may want to fix up his property he may hesitate. He knows only the rough outline facts of the act and its operation. Contractors must be able to explain all the ramifications.

Who's Making Loans

Study of a group of 718 loans taken at random show that the people borrowing are classified as follows:

Occupation	No. of Loans	Percent- age
Clerical	135	18.80
Public Employees..	131	18.25
Mechanics	96	13.37
Business Men	92	12.81
Salesmen	48	6.69
Corp. Officers	43	5.99
Laborers	29	4.04
Rooming House Owners	28	3.90

Business Men (Partners)	28	3.90
Department Heads..	28	3.90
Professional Men...	26	3.62
Foremen	13	1.81
Storekeepers	9	1.25
Drivers and Truckmen	9	1.25
Barbers	3	.42
	718	100.00

And above all, contractors must be willing to give their services or the services of their employees in the campaign to get the home owner to do needed work and insure complete co-operation of all the agencies which must co-operate if maximum success is secured.

This will be no push-over. Badly needed as repair work is, well devised and well planned as this program is admitted to be, anxious and willing as most of the construction industry is to help—every agency must be co-ordinated and made to work together. Are you doing your part?

BETTER RESULTS

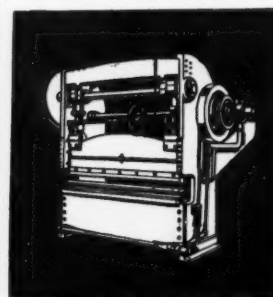
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Use Walsh Asbestos Furnace Cement for certain and satisfactory results on all installation and repair work.

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Producers of High Grade Refractories
for 50 years
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Walsh Asbestos Furnace Cement is furnished in 1, 2, 3, 5, 8 and 10 lb. cans; 25, 50, 100, 250, 500 lb. steel drums. We also manufacture Furnace Tile and Fire Brick.



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Steel Brakes—Presses—Shears

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Install



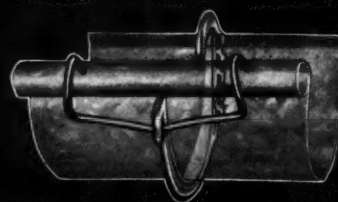
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Made by National are made to fit the job. Parts made to fit only new furnaces will not do as well. "Nothing is obsolete with National."

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"Talk About Profitable Repair Orders and Cleaning Profits with the

TORNADO

Furnace and Boiler Cleaner

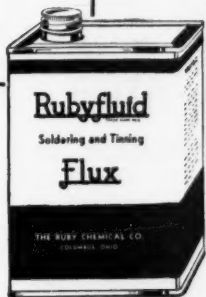


"My TORNADO Furnace & Boiler Cleaner has brought me more profitable repair and replacement business than I have had in years in addition to hundreds of dollars profit on the cleaning. In our 35 years in business it is the most profitable investment we have ever made." So says the General Repair and Equipment Co., Elizabeth, N. J.

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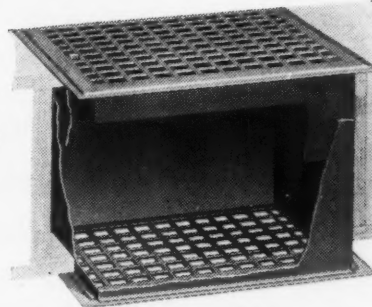
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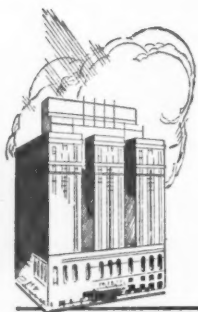
AMERICAN ARTISAN

6 North Michigan Ave. Chicago, Ill.



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CHICAGO

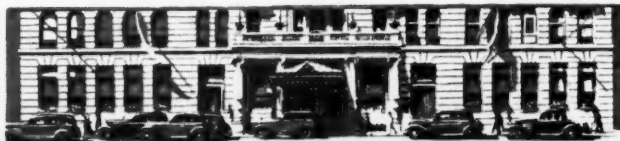
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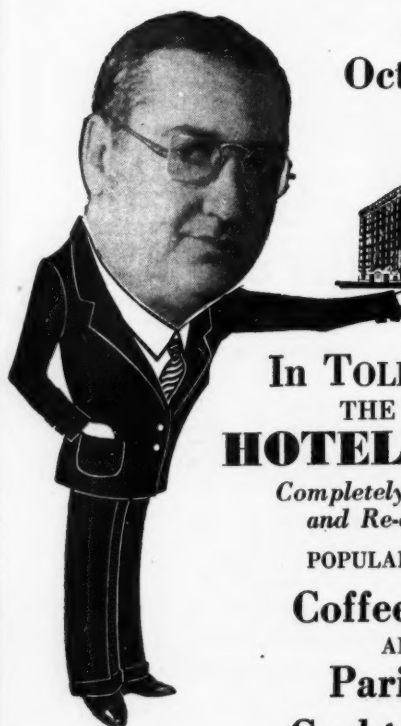
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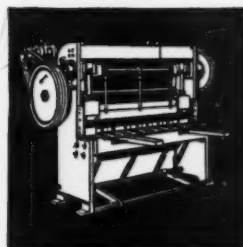
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Index to Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

October, 1934

Aeolus Dickinson 74	Forest City Foundries Co., The 66	Newport Rolling Mill Co..... 65
Air Controls, Inc., Division of The Cleveland Heater Co.... 41	Fox Furnace Co., The..... 7	Northwestern Stove Repair Co. 72
Allegheny Steel Co.....	General Electric Company..... 33	Oakland Foundry Co..... 63
.....Inside Back Cover	Globe Iron Roofing & Corru- gating Co. *	Osborn Co., J. M. & L. A.... 37
American Air Filter Co., Inc. 27	Granite City Steel Co..... 6	Owens-Illinois Glass Co..... 25
American Brass Co..... 5		
American Machine Products Co. 45		
American Rolling Mill Co., The 69	Harrington & King Perf. Co... 72	Parker-Kalon Corp. 8
American Sheet and Tin Plate Co. 70	Hart & Cooley Mfg. Co..... 67	Peerless Electric Co..... 44
Anchor Stove & Range Co., Inc. 50	Henry Furnace & Foundry Co., The10 and 51	Peerless Foundry Co., The.... 71
Apollo Company 61	Hess-Snyder Co. 70	Penn Electric Switch Co..... 24
Auer Register Co..... 45	Hess Warming & Ventilating Co. 62	Perfection Stove Co..... *
Auditorium Hotel 76	Hotel Lenox *	Practical Instrument Co..... 45
	Hotel Melbourne *	
	Hotel Secor 76	Randall Graphite Products Corp. 50
Barber Gas Burner Co., The.. 53	Hotel Wm. Penn..... 76	Republic Steel Corp.....
Bellevue Stratford 76	Hum-O-Zone Co. 48Inside Front Cover
Berger Bros. Co..... 74	Hussey & Co., C. G..... *	Revere Copper & Brass, Inc... *
Bishop & Babcock Sales Co... 46		Ruby Chemical Co., The..... 75
Brauer Supply Co., A. G..... 75		Russell Electric Company..... 3
Breuer Elec. Mfg. Co..... 75	Independent Register & Mfg. Co. 69	Ryerson & Son, Inc., Joseph T. 75
Brown Sheet Iron & Steel Co.. 75	Inland Steel Co.....Back Cover	
Bryan Plumbing & Heating Co., The 47	International Nickel Co., Inc., The 9	Supreme Electric Products Corp. 52
Buffalo Forge Company..... 43	Interstate Machinery Co..... 77	
		Thompson & Company..... 62
Canton Steel Ceiling Co..... *	Lakeside Company 51	Torrington Mfg. Co., The..... *
Clarage Fan Co..... 48	Lau Heating Service, Inc..... 50	
Cook Electric Co..... 47	Liberty Foundry Company..... 73	United States Air Conditioning Corp. 52
		U. S. Pressed Steel Products Co. 58
Dail Steel Products Co..... 52	Meyer & Bro. Co., F..... 68	Up-to-Date Machine Works... 51
Detroit Lubricator Co..... 54	Meyer Furnace Co..... *	
Dreis & Krump Mfg. Co..... 74	Minneapolis-Honeywell Regula- tor Co. 26	Victor Electric Products, Inc... 59
	Mt. Vernon Furnace & Mfg. Co. *	Viking Shear Co..... 73
Ellison Draft Gage Co..... *	Mueller Furnace Co., L. J..... 45	
Emerson Electric Mfg. Co..... 49		Walsh Refractories Corp..... 74
	National Foundry and Furnace Co. 75	Waterloo Register Co., The.... 52
Faultless Heater Corp..... 61		White Mfg. Co..... 42
Firelands Manufacturing Co., The 51		Whitney Mfg. Co., W. A..... 71
		Wise Furnace Co., The..... 64

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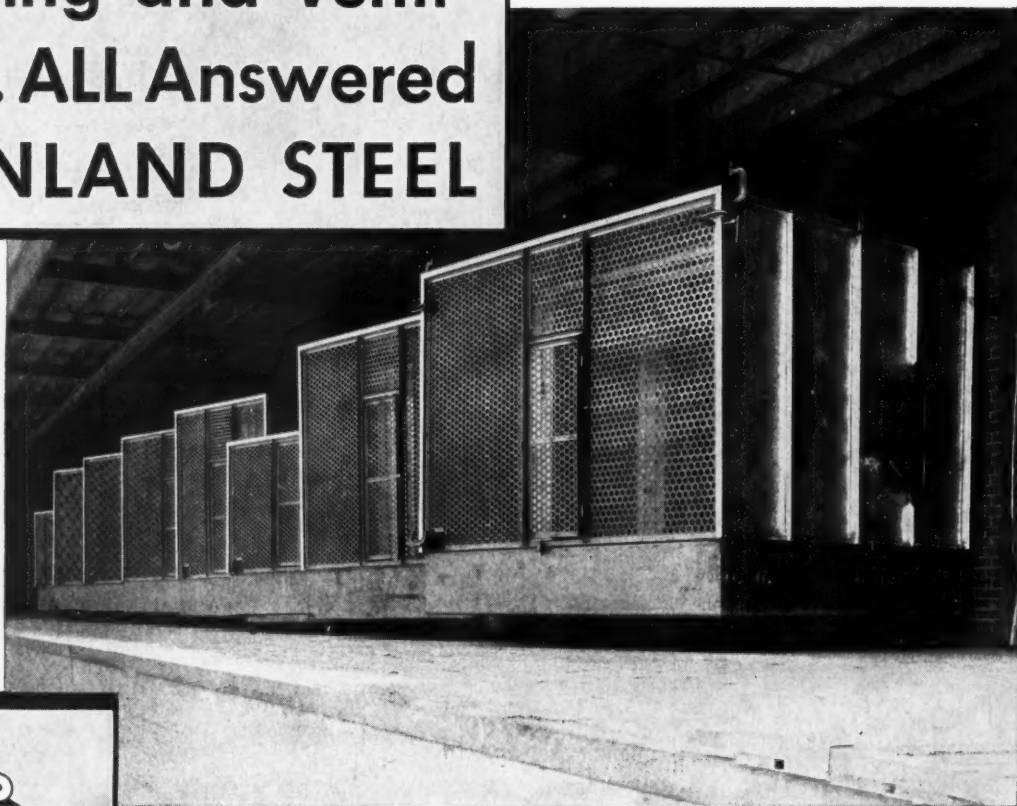
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